21778

National Library of Canada | Bibliothèque nationale du Canada

CANADIAN THESES ON MICROFICHE

THÈSES CANADIENNES SUR MICROFICHE

NAME OF AUTHOR/*NOM DE L'AUTEUR* Rillah Sheridan Carson

TITLE OF THESIS/*TITRE DE LA THÈSE* Auditory and Visual Sequence Focusses and Word Identification Ability of First Grade Pupils

UNIVERSITY/*UNIVERSITÉ* University of Alberta

DEGREE FOR WHICH THESIS WAS PRESENTED/ *GRADE POUR LEQUEL CETTE THÈSE FUT PRÉSENTÉE* M. Ed

YEAR THIS DEGREE CONFERRED/*ANNÉE D'OBTENTION DE CE DEGRÉ* 1974

NAME OF SUPERVISOR/*NOM DU DIRECTEUR DE THÈSE* Dr. W. T. Fagan

Permission is hereby granted to the NATIONAL LIBRARY OF CANADA to microfilm this thesis and to lend or sell copies of the film.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

L'autorisation est, par la présente, accordée à la BIBLIOTHÈQUE NATIONALE DU CANADA de microfilmer cette thèse et de prêter ou de vendre des exemplaires du film.

L'auteur se réserve les autres droits de publication; ni la thèse ni de longs extraits de celle-ci ne doivent être imprimés ou autrement reproduits sans l'autorisation écrite de l'auteur.

DATED/*DATÉ* August 7, 1974 SIGNED/*SIGNÉ* Rillah Carson

PERMANENT ADDRESS/*RÉSIDENCE FIXÉ*
458 - 5 Ohio Drive
Stephenville, Newfoundland

NL-91 (11-73)

THE UNIVERSITY OF ALBERTA

AUDITORY AND VISUAL SEQUENCE FOCUSSES AND WORD IDENTIFICATION ABILITY OF FIRST GRADE PUPILS

by

RILLAH SHERIDAN CARSON

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF EDUCATION

DEPARTMENT OF ELEMENTARY EDUCATION

EDMONTON, ALBERTA
FALL, 1974

c RILLAH SHERIDAN CARSON 1975

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Auditory and Visual Sequence Focusses and Word Identification Ability of First Grade Pupils" submitted by Rillah Sheridan Carson in partial fulfilment of the requirements for the degree of Master of Education.

W T Fagan
Supervisor

Jean Robertson

Henry L Janzen

Date July, 1974

ABSTRACT

Research studies have been conducted to investigate the role that modality preference plays in word identification skills by assessing a child's performance on modality emphasized teaching approaches. However, no studies exist that explored the efficacy of approaches that rely upon the particular sequencing of auditory and visual elements within an approach. A basic contention of this study was that a successful approach to teaching word identification skills is dependent upon both auditory and visual channels and therefore both should be considered in the development of such approaches. More specifically, the purpose of this study was to determine if high and/or low readers learned word identification tasks equally well when taught by an *Auditory-visual Sequence Focus Approach* (*A-V*) or a *Visual-auditory Sequence Focus Approach* (*V-A*).

The nonsense words and the directions for the *A-V* and *V-A* *Approaches* were constructed by the investigator for this study. The *A-V* *Approach* dealt with the words auditorially before exploring them visually while the *V-A* *Approach* dealt with the words visually before exploring them auditorially. The nonsense word items consisted of two lists of six (two-trigram) words constructed according to particular phonics elements and ease of pronunciability.

The sample consisted of twenty-four high and twenty-four low readers as determined by performance on The Gates MacGinitie Reading Test, Primary A, Form 2. Each child was administered the Keystone Visual Screening Test and the Maico audiometer to ensure adequate vision and hearing. A pretest of word identification was given to ensure that no subject was able to pronounce any of the words that were to be taught via the A-V and V-A Approaches.

A counterbalanced design was employed for the two teaching approaches and the two word lists. The A-V and V-A Approaches were individually administered to each child. Performance on the approaches was assessed by subjects' correct pronunciation of the four identification measures for each word. These were entire word, first syllable, second syllable and phoneme count.

Analysis of variance and Pearson product-moment correlations were used to analyze the data. Significant differences were found between high and low readers on both the A-V and V-A Approaches, high readers' scores being consistently higher. Significant differences were revealed between the A-V and V-A Approaches for high readers, the A-V Approach, Lists I and II showing significantly higher scores. Significant differences were found between the A-V and V-A Approaches, List I for low readers, the V-A Approach demonstrating significantly higher scores. No

significant differences were revealed between the A-V and V-A Approaches, List II for low readers except for one measure of word identification - phoneme count.

The findings of this study suggest that high readers prefer an auditory-visual sequence approach while low readers prefer a visual-auditory sequence focus approach in word identification methods. It is also suggested that certain words may influence the results of teaching approaches for low readers. Furthermore the findings suggest that no one approach is best for all readers. Therefore teachers must be prepared to adapt and modify methods of teaching word identification skills to accommodate the styles of individual learners.

ACKNOWLEDGEMENTS

The writer wishes to express her thanks to all who assisted her in this study, and especially to:

Dr. William T. Fagan, Supervisor, for the invaluable counsel and encouragement which he gave so generously during the planning, conducting and reporting of this study.

Dr. Jean Robertson and Dr. Henry Janzen, members of the committee, for their interest and advice.

The staff of the Division of Educational Research Services who assisted in the use of computer facilities.

The principals, teachers and children of the schools involved in this study from the Edmonton Catholic School Board for their assistance and co-operation in the conducting of the experimental work.

Mrs. Evelyn Carson, for her assistance with the auditory and visual screening tests.

My husband, Terry, for his understanding and cooperation throughout the year.

Jacquie Morgan for her co-operation in the typing of this thesis.

TABLE OF CONTENTS

Chapter Page

I. INTRODUCTION 1

Purpose 4

Definition of Terms 4

Hypotheses 5

Assumptions 9

Delimitations 9

Limitations 10

Significance of the Study 11

Overview of the Study 12

II. BACKGROUND OF STUDY 13

The Perceptual Modality Concept 14

Methods of Teaching Word Identification 16

The Phonics Approach 17

The Sight Word Approach 18

Research Studies on Modality and Modality Preference 19

Longitudinal Studies Dealing with Modality Preference 34

Research Studies on Auditory and Visual Integration 41

Auditory and Visual Sequence Focus Approaches in Teaching Word Identification.. 43

Chapter Page

III. THE EXPERIMENTAL DESIGN 46
    Design of the Study 46
    Testing Instruments 46
        Standardized Tests 46
    Materials Constructed for this Study 49
        Word Lists 49
        Neutral Pictures 51
        Final Word Lists 51
        Sequence Focus Approaches 51
        Scoring Procedures 51
    The Sample 52
    Pilot Study 56
    Collection of the Data 57
    Analysis of the Data 59

IV. ANALYSIS AND INTERPRETATION OF TEST DATA ... 61
    Performance on the A-V and V-A Approaches, List I 61
    Differences between High and Low Readers on the A-V Approach and the V-A Approach, List I 66
    Performance on the A-V and V-A Approaches, List II 76

Chapter Page

Differences between High and Low Readers on the A-V Approach and V-A Approach, List II 80

Correlations of Subjects' Performance on the A-V Approach and the V-A Approach 89

Differences between the Performance of High Readers and Low Readers on List I and List II 94

Summary of Findings 98

V. SUMMARY, CONCLUSIONS, IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH 100

Summary 100

Conclusions 101

Hypothesis I 101

Hypothesis II 102

Hypothesis III 103

Hypothesis IV 104

Hypothesis V 105

Hypothesis VI 106

Hypothesis VII 107

Hypothesis VIII 108

Implications for Education 111

Suggestions for Further Reading 114

Concluding Statement 115

Page

BIBLIOGRAPHY 117

APPENDIX A. DESCRIPTIVE DATA FOR THE FINAL SAMPLE 123

APPENDIX B. PRETEST OF WORD IDENTIFICATION 126

APPENDIX C. FINAL WORD LISTS 128

APPENDIX D. NEUTRAL PICTURES AND THEIR CORRESPONDING NONSENSE WORDS 130

APPENDIX E. PRONUNCIABILITY RATINGS ACCORDING TO UNDERWOOD AND SCHULZ (1960) FOR THE THREE LETTER UNITS USED IN THE A-V AND V-A APPROACHES.... 133

APPENDIX F. INSTRUCTIONS AND PROCEDURES FOLLOWED FOR THE A-V AND V-A APPROACHES 135

APPENDIX G. TEST OF WORD IDENTIFICATION-RECORD FORM 144

LIST OF TABLES

Table Page

I. Modality and Modality Preference Studies 28

II. Longitudinal Studies dealing with Modality and Modality Preference 36

III. Summary of Descriptive Data for the Final Sample of High and Low Readers 56

IV. Mean Scores of High and Low Readers on the A-V Approach, List I............................ 62

V. Mean Scores of High and Low Readers on the V-A Approach, List I............................ 64

VI. Summary of Analysis of Variance when considering Entire Word Identification for High and Low Readers and A-V and V-A Approaches, List I.............................. 66

VII. Summary of Analysis of Variance when considering First Syllable Identification for High and Low Readers and A-V and V-A Approaches, List I.............................. 68

VIII. Summary of Analysis of Variance when considering Second Syllable Identification for High and Low Readers and A-V and V-A Approaches, List I.............................. 70

IX. Summary of Analysis of Variance when considering Phoneme Identification for High and Low Readers and A-V and V-A Approaches, List I.. 72

X. Scheffé's Multiple Comparison of Main Effects between A-V and V-A Approaches for High Readers, List I......................... 73

XI. Scheffé's Multiple Comparison of Main Effects between A-V and V-A Approaches for Low Readers, List I.......................... 75

XII. Mean Scores of High and Low Readers on the A-V Approach, List II..................... 77

Table Page

XIII. Mean Scores of High and Low Readers on the V-A Approach, List II 79

XIV. Summary of Analysis of Variance when considering Entire Word Identification for High and Low Readers and A-V and V-A Approaches, List II 81

XV. Summary of Analysis of Variance when considering First Syllable Identification for High and Low Readers and A-V and V-A Approaches, List II 82

XVI. Summary of Analysis of Variance when considering Second Syllable Identification for High and Low Readers and A-V and V-A Approaches, List II 84

XVII. Summary of Analysis of Variance when considering Phoneme Identification for High and Low Readers and A-V and V-A Approaches, List II 85

XVIII. Scheffé's Multiple Comparison of Main Effects between A-V and V-A Approaches for High Readers, List II 87

XIX. Scheffé's Multiple Comparison of Main Effects between A-V and V-A Approaches for Low Readers, List II 88

XX. Correlations of Identification Scores for A-V Approach, List I and V-A Approach, List II for High Readers 90

XXI. Correlations of Identification Scores for V-A Approach, List I and A-V Approach, List II for High Readers 91

XXII. Correlations of Identification Scores for A-V Approach, List I and V-A Approach, List II for Low Readers 92

XXIII. Correlations of Identification Scores for V-A Approach, List I and A-V Approach, List II for Low Readers 93

XXIV. Descriptive Data for the Final Sample 124

LIST OF FIGURES

Figure		Page
1.	Assignment of Phonic Elements to Word Lists I and II	50
2.	Administration of the Teaching Approaches and Word Lists for High and Low Readers	59
3.	Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List I - Entire Word	67
4.	Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List I - First Syllable	69
5.	Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List I -Second Syllable	71
6.	Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List I - Phoneme Count	72
7.	Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List II - Entire Word	82
8.	Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List II - First Syllable	83
9.	Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List II - Second Syllable	85
10.	Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List II - Phoneme Count	86
11.	Comparison of Mean Scores for High Readers on A-V Approach, List I and II	94
12.	Comparison of Mean Scores for High Readers on V-A Approach, List I and II	95
13.	Comparison of Mean Scores for Low Readers on A-V Approach, List I and II	96
14.	Comparison of Mean Scores for Low Readers on V-A Approach, List I and II	97

CHAPTER I

INTRODUCTION

Both meaning and word identification are necessary components in reading.

> The pupil cannot read unless he can associate the appropriate meaning with the appropriate symbol. ... Logically, identification of the symbol comes before the association of meaning with it (Dechant, 1970, p. 204).

Many methods of teaching word identification skills exist. These methods may vary greatly in their objectives and methodologies or they may vary only slightly. Ultimately these methods involve both the auditory and visual modalities. Teaching methods may explicitly or implicitly place emphasis on either one or both of these modalities.

The modality concept has been discussed in some detail by Wepman (1968). Recognition of the sensory bound nature of children's learning behaviour was first noticed in children who had learning problems. Some of these children expressed a greater facility for learning by one input channel than by another. Although many of these children had neurological impairments, further observations made on children with no known impairments showed similar findings. Wepman concluded that children differ in their use of specific modalities and that such differences necessitate tailoring of reading methods to suit the style of individual learners.

De Hirsch has said that there are certain children "for whom specific reading approaches will make a world of difference" (1962, p. 225). For a child with lagging visual-spatial competence, but adequate auditory ability, a phonics approach may make it easier for him to link the visual with the auditory structure of the word. On the other hand, the child who has weak auditory competence would undoubtedly do better with the whole word approach.

Such findings have led researchers to take a new look at reading methodologies, especially in the area of teaching word identification skills.

Mills (1956) has devised The Learning Methods Test which attempts to determine the appropriate method; visual, auditory, kinesthetic or combination, most effective for the individual child. Other researchers (MacAulay, 1965; Cooper, 1969; Taylor, 1969) have used this test with slight adaptations, but have kept the same objectives as Mills.

Since 1956, when Mills first constructed his testing instrument, and especially in the last ten years, there has been a proliferation of research studies that have explored the concept of modality and modality preference as it relates to reading and reading achievement. Many of these studies have moved in one direction; namely, concentration on a single modality. The approaches used in these studies have been so devised that they have either an auditory focus or a visual focus. Since the reading process is influenced by both the auditory and visual channels, attention should not be paid exclusively to a single modality.

While such single modality focus approaches may be the most efficient method for some children, they are by no means suitable for all children. Such wholly visual or wholly auditory approaches to teaching word identification skills are meant for the child whose auditory or visual pathways are not functioning adequately.

> Fortunately, most children have some capacity to function with both visual and auditory perception. The two abilities have their own rates of development and, when mature, most often show only approximately equal maturational levels (Wepman, 1964, p. 30).

For these children, who are in the majority, Wepman suggests two different approaches:

(a) for the child who shows his best ability to be visual, a visual emphasis in reading with immediate auditory reinforcement is suggested;

(b) for the child with good auditory ability, an auditory emphasis with strong, but secondary sight training is recommended.

Although studies have been conducted to determine the most effective "single modality emphasized approach" for teaching word identification skills there has been little or no research reported to indicate how children learn word identification tasks using an approach that combines both visual and auditory modalities. An unanswered question remains; does the particular sequencing of auditory and visual elements within a combination approach affect a child's ability to learn word identification skills?

I. PURPOSE

The purpose of this study is to determine if high and low reading achievers learn word identification tasks equally well when taught by:

(a) an approach which has an auditory-visual sequence focus;

(b) an approach which has a visual-auditory sequence focus.

II. DEFINITION OF TERMS

For the purposes of this study, the following terms will be associated with that meaning given in the definitions below.

Auditory-visual sequence focus (A-V) - First, an emphasis will be placed upon the sound qualities of the word and then upon the visual aspects of the word (see Appendix F).

Visual-auditory sequence focus (V-A) - First, the visual appearance and other visual clues will be emphasized, and then the sound qualities of the word will be stressed (see Appendix F).

Word identification refers to the correct pronunciation of a word.

Reading achievement refers to the mean standard scores for the Vocabulary and Comprehension subtests of the Gates Mac Ginitie Reading Test, Primary A, Form 2.

High/low reading achiever refers to a student who scores at least one-half a standard deviation above/below the mean of the standard score on the Gates Mac Ginitie Reading Test.

Entire word identification score refers to the correct pronunciation of the entire word.

First syllable identification score refers to the correct pronunciation of the first trigram unit.

Second syllable identification score refers to the correct pronunciation of the second trigram unit.

Phoneme identification score refers to the correct pronunciation of phonemes in their correct sequence within a word.

III. HYPOTHESES

Based on a review of the literature and in light of what the investigator proposes to do in this study, the following research and null hypotheses have been formulated. The level of significance required for the null hypotheses has been set at the .05 level.

Research Hypothesis I

High readers will achieve higher scores than will low readers on the A-V and V-A Approaches for List I.

Null Hypothesis I

There is no significant difference between high and low readers on the A-V and V-A Approaches for List I as determined by scores on:

(a) entire word
(b) first syllable
(c) second syllable
(d) phoneme count.

Research Hypothesis II

High readers will achieve higher scores than will low readers on the A-V and V-A Approaches for List II.

Null Hypothesis II

There is no significant difference between high and low readers on the A-V and V-A Approaches for List II as determined by scores on:

(a) entire word
(b) first syllable
(c) second syllable
(d) phoneme count.

Research Hypothesis III

High readers will score equally well on the A-V and V-A Approaches, List I.

Null Hypothesis III

High readers do not differ significantly between scores on the A-V and V-A Approaches, List I for:

(a) entire word

(b) first syllable

(c) second syllable

(d) phoneme count.

Research Hypothesis IV

High readers will score equally well on the A-V and V-A Approaches, List II.

Null Hypothesis IV

High readers do not differ significantly between scores on the A-V and V-A Approaches, List II for:

(a) entire word

(b) first syllable

(c) second syllable

(d) phoneme count.

Research Hypothesis V

Low readers' scores will be lower on the A-V Approach, List I than on the V-A Approach, List I.

Null Hypothesis V

Low readers do not differ significantly between scores on the A-V and V-A Approaches, List I for:

(a) entire word

(b) first syllable

(c) second syllable

(d) phoneme count.

Research Hypothesis VI

Low readers' scores will be lower on the A-V Approach, List II than on the V-A Approach, List II.

Null Hypothesis VI

Low readers do not differ significantly between scores on the A-V and V-A Approaches, List II for:

(a) entire word

(b) first syllable

(c) second syllable

(d) phoneme count.

Research Hypothesis VII

The identification scores of high readers on the A-V Approach will be related to their scores on the V-A Approach.

Null Hypothesis VII

There are no significant correlations for high readers between:

(a) A-V Approach, List I and V-A Approach, List II

(b) A-V Approach, List II and V-A Approach, List I.

Research Hypothesis VIII

The identification scores of low readers on the A-V Approach will not be related to their scores on the V-A Approach.

Null Hypothesis VIII

There are no significant correlations for low readers between:

(a) A-V Approach, List I and V-A Approach, List II

(b) A-V Approach, List II and V-A Approach, List I.

IV. ASSUMPTIONS

It is assumed that each subject's reading score on the Gates Mac Ginitie Reading Test, Primary A, Form 2 is indicative of his actual reading achievement.

It is assumed that each subject's performance, in terms of the scores obtained, after having been taught by different methods, is indicative of his ability to learn through the different tasks presented.

A further assumption is that the performance of the grade one subjects in this study is representative of grade one children within the Edmonton Catholic School System.

It is also assumed that reading materials to which the children in the sample were exposed, beyond the basic programs, did not bias the results of the teaching methodologies employed in the study.

A final assumption is that the A-V and V-A Approaches devised for this study are distinct in their sequence focus and are suggestive of the modality processes that function in children who are learning to read.

V. DELIMITATIONS

The object of this study is not to determine what sensory channels the child is using in the learning tasks. Rather the object is to determine which of the two teaching approaches may be preferable for a child by assessing his performance on the pronunciation of words and word parts.

The focusses of the two teaching approaches cannot be wholly auditory or visual. As far as is possible, and realistic for application to teaching situations, the visual and auditory aspects of teaching methods will be stressed.

VI. LIMITATIONS

The generalizability of the findings are limited by the following factors:

(a) The study was conducted under highly controlled situations which entailed a one-to-one teaching situation. Therefore the generalizability of the findings may be limited to such learning conditions.

(b) The population from which the sample was taken was limited to middle and upper middle socioeconomic neighbourhoods in Edmonton, Alberta.

(c) The population from which the sample was drawn was limited to four grade one classrooms.

(d) The study was conducted in the third quarter of the school year. Therefore generalizations would be restricted to those students with similar length of school experience.

(e) Only students who passed the visual and auditory screening tests were eligible for the study.

(f) Only those students who scored one-half a standard deviation above or below the mean standard score of the Vocabulary and Comprehension subtests of the Gates Mac Ginitie Reading Test, Primary A, Form 2 were eligible for this study. Therefore any generalizations would be restricted to those students identified here as high and low reading achievers.

(g) The number of subjects in the study was limited to forty-eight.

VII. SIGNIFICANCE OF THE STUDY

The need for a more specific evaluation of word recognition methods still exists. Witness the myriad approaches, most of which hesitate to mention the part the two most crucial sensory learning channels, the auditory and visual modalities, play in the development of their reading methods. Witness also the reading failures. Hopefully, a study of the particular sequencing of auditory and visual elements within a word recognition approach will provide more information on one aspect of the reading process, the ability to learn word identification skills. If children do differ in their performance on the two teaching approaches then it would seem essential that initial grouping and instructional procedures take account of these differences in teaching word identification skills to accommodate the preferred styles of these children.

VIII. OVERVIEW OF THE STUDY

Chapter I has included the introduction of the problem and purpose of the study. Also included were the definition of terms, research hypotheses, assumptions, limitations and significance of the study.

Chapter II will outline the framework and rationale under which the present study was conducted and will provide a review of the literature relevant to the problem.

Chapter III will consist of the experimental design of the study, the standardized and experimental tests used, the construction of materials for the study, a description of the sample, the pilot study and the collection and methods of analysing the data.

Chapter IV will contain the results of the test data which will be analyzed and explained.

Chapter V will include the summary, conclusions and implications of the study.

CHAPTER II

BACKGROUND OF THE STUDY

The U.S. Office of Education conducted a nationwide survey to determine the best method of teaching beginning reading. The results were inconclusive. It appeared that no one best method existed for all children. Most educators were not surprised. They hardly expected that a panacea for effective reading instruction would be found in this way.

Such a survey would have been more profitably directed towards determining which method was best for which child. Educators such as Dechant (1970, p. 219) and Wepman (1968, p. 6) have long emphasized the importance of individual learning differences in children. Attention, therefore in studies of this kind, should be directed toward the child and how he learns. Such findings should help establish a methodology to be followed in teaching each child how to read.

In order to provide a background of information for this study this chapter will contain a review of the literature relevant to the role of sensory modalities in the development of word identification skills. First the perceptual modality concept will be presented. Methods of teaching word recognition skills which hold particular relevance for modality preference will then be examined. Finally, research studies that have dealt with modality preference and modality integration will be discussed to provide background and to help develop a rationale for the auditory and visual sequence focus approaches constructed for this investigation.

I. THE PERCEPTUAL MODALITY CONCEPT

Perception, although difficult to define, is used to mean an awareness of the objects or conditions in one's environment. Inherent in this awareness is a recognition of sensory information; how things look, sound, feel, taste or smell. The sensory modes of receiving information (or learning) are basically those just mentioned; seeing, hearing, touching, tasting and smelling. An individual, then, receives an awareness of objects around him by the excitation of one or more of his sensory modes (Allport, 1955, p. 14; Lerner, 1971, p. 118).

Differences exist in the way an individual perceives the objects or conditions around him (Allport, 1955, p.14). Possibly differences exist in the way children receive information, or differences exist in the way children learn. Some prefer to learn primarily by seeing, others learn best by hearing and possibly others prefer to learn by touching. These types of learners have been labelled visiles, audiles and haptics respectively. "Each of these ways of learning and receiving information is called a perceptual modality" (Lerner, 1971, p. 118).

The sensory modalities of smelling and tasting can be eliminated here since they have little to do with the process of learning how to read. The remaining sensory modalities; visual, auditory and tactile are the most important in the reading process.

If a child differs in his modes of perceiving or if he expresses a predilection for the visual, auditory or tactile mode "these differences may profoundly affect his aptitude for learning by certain methods" (MacAuley, 1965, p. 2). Some children simply cannot rely on a visual image while others rarely depend upon auditory imagery. When the latter "read" a word they may "see" the word while those with auditory imagery may "hear" the word (Dechant, 1970). Furthermore the maturational pattern of these sensory modalities may vary from one individual to another (Wepman, 1967; Dechant, 1970).

The implication as stated by Dechant seems clear. No one reading method is best for all children. Therefore differences in children must be considered and reading methods should be directed towards the development of the sensory modalities of each child (Dechant, 1970).

II. METHODS OF TEACHING WORD IDENTIFICATION

Research (Mills, 1956; Wepman, 1964; Peck, 1969; Dechant, 1970) has generally supported Wiener and Cromer (1967) who state that reading is a two-stage process involving first identification and then comprehension. Identification appears to be largely the result of a combination of four basic word recognition or word analysis techniques (Guszak, 1972). The four techniques that are basic to most reading programs are; context analysis, sight words, phonic analysis and structural analysis. Combinations and variations of these techniques appear to be limitless. Aukerman (1971) has described over one hundred different approaches to beginning reading. However, it is beyond the scope and design of this study to explore the full gamut of these approaches. Rather, an attempt will be made to examine the methods that might have the greatest relevance for a child's sensory modality style. Since this study is primarily concerned with visual and auditory approaches to teaching word identification, it will confine itself to a description of the phonics approach and the sight word approach.

Generally "the phonics approach" in reading is considered to be an auditory approach while the "sight method" is called a visual approach (Bond, 1935, pp. 43-44). de Hirsch (1962) expands such a statement and suggests that the child who is lagging in visual-spatial abilities, but who has adequate auditory abilities will do better with phonics "which involves temporal rather than spatial organizational principles" (p. 225). She further suggests that the child whose auditory competence is poor and "whose frustration level is too low to build up words slowly and patiently from their determining parts" (de Hirsch, 1962, p. 225), will undoubtedly learn better by the whole word approach.

The Phonics Approach

Phonics instruction is geared to a system in which specific sound generalizations are keyed to specific letter symbols (Dechant, 1970; Durkin, 1974; Guszak, 1972). The content of phonics is based upon a series of generalizations about the characteristic sounds associated with individual letters or groups of letters. Phonics programs differ in many respects. One program may advocate beginning phonic instruction with consonants, another with vowels, while a third focusses on blending consonants and vowels.

The phonics approach is often classified as a synthetic method since the emphasis is on blending together the separate sounds of the letters to form words. The child is directed towards sounding out words letter by letter and is then required to fuse these sounds together to get at the sound of the whole word (Harris, 1970, p. 61). However, the analytic aspect of phonics instruction is also given emphasis in beginning reading programs. In the analytic approach the child sees the whole word and attempts to use word analysis skills to break it down structurally or phonemically into its parts (Aukerman, 1971, p. 27). "Analytic phonics teaches letter sounds as integral parts of words that are already familiar in reading and listening" (Spache and Spache, 1964, p. 265). Dechant (1970) suggests that for independence in word recognition children need both analytic and synthetic approaches.

The Sight Word Approach

The sight word approach is generally considered to be an analytical approach. It is often called the whole word method. Here the child is directed towards an examination of the length and shape of a word in hopes of distinguishing it from other words. The shapes of letters are also examined by drawing attention to such things as ascending and descending letters. To assist children in identifying words, pictures are often used as referents in the whole word approach. Most basal series initiate reading instruction with a whole word methodology (Guszak, 1972; Durkin, 1974).

For some children the sight word approach may be the only viable method of teaching word identification. "They cannot analyze the word into its parts, or have such poor auditory-discriminatory skills that they cannot deal with phonics" (Dechant, 1970, p. 219). However, it is suggested that the sight word approach by itself will not meet the needs of every child nor perhaps all the needs of even one child.

In conclusion, this cursory examination of the phonics approach and the sight word approach was presented as an introduction to auditory and visual sequence focus approaches to teaching word identification skills with which the present study is concerned. Although the auditory and visual sequence focus approaches cannot be equated with the traditionally labelled "phonics approach" and "sight word approach" they do, as this investigator suggests, share commonalities.

III. RESEARCH STUDIES ON MODALITY AND MODALITY PREFERENCE

Methods in teaching word recognition skills reviewed in the previous section have tended to focus on the unit of presentation. But some educators have chosen to focus on the modality of presentation. Wepman (1968) suggests that "the concept of differential modality proclivity would argue for tailoring the instruction...to the capacity of the individual child" (p. 4). By determining a child's particular modality approach to learning, the teacher should be able to provide the optimum teaching method for that particular child.

A concern for the role that modality plays in learning words is not new to the field of education. Harris (1964) states that as early as 1860 Fechner reported individual differences in imagery while in 1880 Binet was describing auditory and visual types. Binet stated that the auditory type appears to recall a passage by improvising the sounds of the words upon the page rather than the visual aspects of the page itself. Whitehead (1896), using nonsense words, carried out a study concerned with the visual and aural memory of adults. He concluded that the visual method was superior for short term retention.

After the turn of the century educators appeared to lose interest in modality preference until Lowenfeld in the late thirties began to investigate "visual" and "haptical" types. Since that time research studies have been conducted to provide an empirical base for such theories which stress the importance of the modality-bound nature of children's learning behavior. Because of the number of studies only a few illustrative ones will be dealt with here in any great detail. Other studies beginning with Lowenfeld (1945) will be presented in tabular form in Table I, pages 28 to 33.

The first study to be examined here is that of Mills (1956). Concern about the lack of a formal testing instrument to measure modality preference led Mills (1956) to devise The Learning Methods Test to determine a pupil's learning strengths and weaknesses. Mills' testing instrument has been used with slight adaptations and has provided a framework for many modality studies since he developed it in 1956.

The procedure involves teaching each child individually over a period of four days. Each day the subject would be taught ten new words by a different method. One method has an auditory emphasis, while the others have a visual, kinesthetic or combination emphasis. The child would be taught one series of words per day and then given a test of immediate retention. Twenty-four hours later he would be given a delayed retention test and taught a new series of words. On the basis of the scores from these tests, a learning mode preference would be determined.

The visual method exclusively stresses the visual appearance and other visual clues of the words. The child would be asked to look at the picture of each word, then at the word card and say what it was. He would then be asked to use each word in a sentence. The length and configuration of words would be discussed and compared.

The auditory method stresses the sound qualities of each word. The examiner would name each letter of a word, sound it out and then ask the child to sound it out, fusing the sounds together to form the word. The child would then be asked to give words that begin and end with the same sounds. The examiner would keep repeating the ten words with exaggerated sound stresses, asking the child to listen and then say them himself.

In the kinesthetic method the child would trace over each word several times with his finger. He would also be asked to say the word while tracing it. Then he would write out the word, again saying it while he wrote.

The combination method would give equal stress to the visual, auditory and kinesthetic approaches. This method would begin by the child looking at the picture, then at the word and saying what it was. The sounds of the letters would then be stressed. The child would then write the ten words, tracing them after he wrote them. Finally the child would look at each picture, write the corresponding word, and sound it out.

The materials for the LMT consist of four sets of graded picture-word cards and a manual of directions which provides specific instructions for the four fifteen-minute teaching lessons. A pretest of word recognition is given to each subject to determine the appropriate words to be used in the test. Each subject would have his own set of "unknown" words to be "taught" to him via the different modalities.

Mills, himself used this test with a group of thirty-nine boys and nineteen girls in grades two through four in five public schools in Pisco County, Florida (Mills, 1956). The variables were limited to sex, chronological age, reading level, and intelligence. Children were screened for visual and auditory acuity and only monolinguals were used as subjects. Only one teacher was employed in the study. Mills found that for children of lower intelligence the visual and kinesthetic methods were the most effective. For children of average intelligence the visual and combination methods were the most effective. No one method was found to be truly superior with children of high intelligence. The visual method appeared to be best for the seven-year olds, the kinesthetic for the eight-year olds but no method was outstandingly effective for nine year olds. There were no significant differences between the sexes for any of the four methods.

A study conducted by MacAulay (1965) was similar to that of Mills (1956). She used his test instrument, The Learning Methods Test with sixty-two grade one subjects but extended the training from fifteen to twenty minutes and also made adaptations in the methods of presentations, particularly in the kinesthetic method. In addition to the variables of sex, CA, reading achievement and intelligence that were considered in Mills' study, MacAulay included visual, auditory and motor aptitudes to "find corroborative evidence of preference for learning by a particular sensory mode" (MacAulay, 1965, p. iii).

MacAulay's findings were somewhat more substantial than those of her predecessor, Mills. Briefly the most salient of these are:

(a) The "delayed recall of words learned by the visual and kinesthetic methods correlated significantly with the ability to hold in mind the wholeness of a figure while attending to its significant details" (MacAulay, 1965, p. iv).

(b) Learning words by the auditory method showed a significant relationship to auditory discrimination.

(c) Boys generally learned better by the visual and auditory methods.

(d) Little relationship was shown between I Q and the ability to learn by any one method.

(e) The combination method was not superior for any one group of learners.

A modified version of the Learning Methods Test was used by Cooper (1969) to investigate the modality preference of thirty high and low readers in grade one. A consensus of teacher ratings on children and the Gates MacGinitie Reading Test, Primary A, Form 1 were used to measure reading achievement. Cooper made two major changes in Mills' test; a change from the use of real words to the use of nonsense syllables and more explicit teaching procedures. Five nonsense syllables (trigrams) were used rather than real words because Cooper felt the use of real words would have presented a problem of finding unknown words to teach each individual in each modality. By using nonsense syllables all subjects could use the same words (unlike the Mills (1956) and MacAulay (1965) studies) for the teaching cycles of each of the four learning tasks. Cooper chose not to consider "meaning" of the words and consequently omitted the use of pictures; a step included in the LMT for each teaching method to ensure the subject knows the meaning of each word was also omitted. Cooper (1969) stated that the purpose of the study was to look only at the effect of modalities and the additional variable of meaningfulness was beyond the scope of his investigation (p. 67). Five syllables were assigned to be taught via each modality. The order of modality presentation was counterbalanced. However, Cooper neglected to counterbalance the four lists of words. No pretest of word recognition was given to determine if any of the subjects were able to pronounce the words. The visual modality utilized the aspects of word length and configuration for teaching. Each subject compared the length of the syllables and matched each syllable with its correct configuration. The auditory modality used the aspects of sounds and rhyming words in teaching. The sound elements of the syllables were isolated and blended together and a rhyming word was identified. The kinesthetic modality involved tracing and copying each syllable. The combination modality utilized the aspects of sight, sound and tracing in teaching. The administration of the tests was the same as the LMT. The subjects were taught the syllables until they correctly named all five nonsense syllables or completed ten trials of each teaching cycle. The findings suggested that no single modality pattern characterized the high or low readers as a group. The variation in scores between modalities was greater for low readers than for high readers.

A study on modality preference, but not using Mills' Learning Methods Test was conducted by Jones (1970) with ninety third grade children. The Reading Comprehension Subtest of the Metropolitan Achievement Test was used as the measure of reading achievement. The test of modal preference was an individually administered measure of the differential performance in learning auditory and visual labels for pictures of concrete objects. The auditory labelling part of the test used pictures of four common animals. The auditory labels consisted of the phonemic representations of three letter nonsense syllables with low associational values. For this learning task the examiner would ask the subject to identify the four pictures. He would then tell the subject that he had given the animals funny names which he wanted him to learn. The examiner would then pronounce the nonsense word for each picture and the child would repeat it. After dealing with all words in this manner the examiner would show the subject one picture and ask what it was. The criterion for completion of the learning task was two consecutive perfect trials or a maximum of twenty trials. The visual labelling part of the test used the same pictures, but included four printed words made from a false alphabet. The subject was told that each printed word was the name of each particular picture. The subject would be shown the picture and asked to find the corresponding printed word. The criterion measure for visual labelling was the same as for auditory labelling. Modal preference was established by the differential performance of the subjects on the auditory and visual tasks. Jones also included a measure of auditory-visual integration. The subject was required to associate the visual labels (printed words) with the auditory labels. In the two previous tasks of visual labelling and auditory labelling pictures had been used for association, but now only the "written and spoken words" were used. The subject was required to pronounce each "written word" correctly. The findings showed that neither auditory labelling, visual labelling, modal preference or auditory-visual association correlated significantly with reading achievement.

From the reviews just presented and from the studies summarized in Table I, it appears that no conclusive results can be drawn from the findings of the modality studies. The designs of the studies, the ages of the subjects and the test instruments obviously were important factors in explaining the discrepant results.

TABLE I. MODALITY PREFERENCE STUDIES

Study	Modalities Studied	Subjects	Procedures	Results	Comments
Lowenfeld (1945)	visual, haptical	224 adults	A series of aptitude tests were administered to all subjects. An attempt was made to discriminate between people whose tendency was visual or haptical by assessing their performance on the tests.	On the basis of the results of the five tests 47 percent of the subjects were visual, 23 percent were haptic and 30 percent were unidentifiable.	The majority of the study dealt with non-visual tasks. Lowenfeld did not relate his findings to the process of reading exclusively.
Berman (1939)	visual-auditory, visual-auditory-kinesthetic	17 partial reading disabled subjects	The sample was divided into 2 groups; 1 received visual-auditory instruction and the other visual-auditory-kinesthetic instruction in counter balanced order. Each group was taught 10 nonsense words under each procedure.	The results indicated no differences between the 2 methods in a delayed recall task of 24 hours.	The kinesthetic element was defined as tracing the words.

TABLE I. (Continued)

Study	Modalities Studied	Subjects	Procedures	Results	Comments
Forster (1941)	visual, visual-kinesthetic	40 psychology undergraduates	The visual method included looking at the nonsense word and saying it while the visual-kinesthetic added the element of tracing the word.	The visual mode of presentation was found to be significantly better.	
Roberts and Coleman (1954)	visual, visual-kinesthetic	all boys, 27 reading failures, 28 normal readers	Nonsense syllables were taught by a visual and a visual-kinesthetic (tracing) procedure. The testing cycle consisted of each child's writing from memory as many of the syllables as possible.	Reading failures showed less success when the visual was the dominant mode.	Reading failures had had previous practice with kinesthetic methods.

TABLE I. (Continued)

Study	Modalities Studied	Subjects	Procedures	Results	Comments
Lockard and Sidowski (1961)	visual, auditory, visual-auditory	above average students, 18 fourth 18 sixth graders	Nonsense syllables were taught by these 3 sensory methods. Subjects were randomly assigned to overt or covert sub-groups. There was a counterbalanced presentation of sensory variables. The overt group was required to recall and write down the syllables after each of the 14 trials. The covert group wrote down the syllables only after the fourteenth trial.	A consistent superiority for the visual and visual-auditory presentation for overt practice condition was shown for forth and sixth graders. Covert practice was superior for sixth graders through all modalities.	Only above average students participated. The auditory method consisted of spelling the words out serially.

TABLE I. (Continued)

Study	Modalities Studied	Subjects	Procedures	Results	Comments
Coleman (1962)	visual, auditory, kinesthetic, combination	51 subjects from the Psychological Clinic at the University of California	Mills' Learning Methods Test. 24 graduate students administered the tests.	No significant difference in learning by any of the 4 modes was shown for underachievers. Average students preferred the visual or combination method.	The teacher variable was not controlled. The subjects ranged in age from 7 to 28 years.
Katz and Deutsch (1964)	visual, auditory, auditory-visual	48 negro males in first, third and fifth grades	The visual task used pictures rather than words. The auditory task used one syllable nouns. The combination task used pictures and nouns (interspersed). The child was required to repeat 8 items immediately after presentation.	Poorer readers' learning rate for visual material was almost as rapid as normal readers. Poor readers had difficulty with auditory material, however they learned better when it was interspersed with visual material.	The procedures followed place some doubts upon the results; the visual task used pictures rather than words while the auditory task used one syllable nouns.

TABLE I. (Continued)

Study	Modalities Studied	Subjects	Procedures	Results	Comments
King and Muehl (1965)	visual, auditory, kinesthetic	210 kindegarten children	Five types of sensory cues were all accompanied by the printed word; picture, auditory, picture-auditory, auditory-echoic, or picture-auditory-echoic. After the trial the child was required to recognize the printed word.	Similar words were learned faster by picture and echoic cues. Dissimilar words were learned faster by auditory cues.	
Arnold (1968)	visual, auditory, kinesthetic, combination	12 disabled readers aged 11 to 16 years	Mills' *Learning Methods Test* provided the framework for the study. The teaching procedures were modified for a small group instructional setting.	It was found that no one teaching method demonstrated to be superior. The kinesthetic method was found to be less effective than the other methods.	The visual method was somewhat better than the other methods.

TABLE I. (Continued)

Study	Modalities Studied	Subjects	Procedures	Results	Comments
Nelson (1970)	auditory, visual, auditory-visual	457 grade one children, sub-groups of 18 audiles and 18 visiles	Sub-groups of audiles and visiles were identified on the basis of scores from auditory and visual sub-tests of two reading readiness tests. Sub-groups were taught a word recognition task by auditory, visual or combination methods.	5.3 percent were identified as visiles and 8.3 as visiles. From the initial group of 457, the mean acquisition and recall scores of visiles was higher than audiles. Visiles learned well by all methods but audiles preferred the auditory method.	When teaching methods were geared to their preferred mode of learning, audiles achieved as well as visiles. There was no mention of counter-balancing the administration of methods.
Wolpert (1970)	visual, auditory, kinesthetic	52 grade one children	The study basically followed Mills' method; six words rather than ten were used. The imagery values of words was a variable considered. The words in each list were controlled for length and configuration.	No one method found to be superior for the entire group or any sub-group dichotomized on the bases of sex, readiness test score or I.Q. score. Higher I.Q.'s performed better on all methods. Boys performed better than girls.	

IV. LONGITUDINAL STUDIES DEALING WITH MODALITY PREFERENCE

One factor which may affect how well a child learns words is the amount of time available for teaching. A number of researchers conducted longitudinal studies on the modality preference of various subjects. As with the modality and modality preference research studies explored earlier in this chapter longitudinal studies will be presented in tabular form in Table II, pages 36 to 40. One longitudinal study will, however, be examined at greater length to illustrate this type of study.

Bateman (1968) conducted a longitudinal study with eight grade one classes studying the visual and auditory modalities. The basic purpose of the study was to explore the efficacy of an auditory approach compared to a visual approach when children were homogeneously grouped by preferred learning modalities and when they were not so grouped. Each child was labelled a visile or an audile on the basis of his performance on the two ITPA subtests of memory. If a child's auditory score exceeded his visual score by eight months he was designated as an auditory subject, and vice versa. Only four of the eight classes were so tested for their modality preference. The remaining four classes were nonplacement classes; two received the auditory method and two received the visual method. The children who were designated as audiles or visiles were assigned to an auditory or visual method class. For example, one half of the subjects who were identified as audiles were assigned to an auditory method while the remaining half were assigned to a visual method. There were no significant differences among the classes on IQ, MA, or total reading readiness. The auditory method classes used the Lippincott Beginning Program while the visual method classes used the Scott, Foresman Series. At the end of first grade, one year later, the Gates Primary Word Recognition and Paragraph Reading Tests were administered to all eight classes. Results showed the auditory method to be significantly superior in the nonplacement classes. Analysis of variance revealed the auditory method to be superior to the visual method and auditory subjects to be superior to the visual subjects. There was no interaction between subjects' preferred modality and method of instruction used. The visual subjects who were good readers were substantially above the average IQ for the total group, while the auditory subjects who were poor readers were appreciably below the group mean in intelligence. Bateman says this suggests that children who prefer the visual modality are handicapped, relative to those who prefer the auditory modality in reading. However, there were limitations in the study. The general ability and achievement level was unusually high; only one child had an IQ below 100 and a grade score of 2.9 separated the good from the poor readers. Also, good and poor readers were identified after the treatments rather than before.

TABLE II. LONGITUDINAL STUDIES DEALING WITH MODALITY PREFERENCE

Study	Modalities Studied	Subjects	Procedures	Results	Comments
de Hirsch, Jansky and Langford (1966)	auditory, visual	53 kindegarten children	Modality strength was determined by comparing a child's performance on 4 auditory tasks; Imitation of Tapped Patterns, Auditory Discrimination, Language Comprehension and the Gates Rhyming Test and 4 visual tests; Bender Visuo-Motor Gestalt, Horst, Gates Matching, and Word Recognition Tests.	10 subjects indicated a modality preference; 7 audiles and 3 visiles on the basis of the 8 tests.	3 visiles and 5 audiles identified in kindegarten received high reading scores 2 years later. However, 2 of the 7 audiles had not received phonic training and had failed their reading tests. No statistics were available.

TABLE II. (Continued)

Study	Modalities Studied	Subjects	Procedures	Results	Comments
Taylor (1969)	visual, auditory, kinesthetic, combination	60 low achievers in grade one as identified by the Gates Mac Ginitie Reading Test	The Learning Methods Test provided the framework for the study. Minor adjustments were made in the materials and teaching procedures. The 60 were identified as having preferred modes of learning from performance on the LMT. The 60 subjects were randomly assigned to a treatment or non-treatment group. The treatment groups were taught by methods tailored to their preferred modes while the control group was taught new words in the usual manner for a six-week period.	The findings showed there was no significant improvement in the word-recognition skills as measured by the post test of the Gates MacGinitie Reading Test for subjects in the treatment groups.	A number of teachers took part in the study thereby limiting the similarity and continuity of the teaching approaches.

TABLE II. (Continued)

Study	Modalities Studied	Subjects	Procedures	Results	Comments
Smith (1969)	auditory, visual	72 culturally disadvantaged grade one subjects	Subtests of *ITPA* were used to identify auditory or visual types. Subjects who expressed no preference were designated as controls. Three reading treatments *ITA*, *Words in Colour*, and *Supplemented Conventional Reading Program* were the methods used. An even distribution of subjects were randomly assigned to each reading group for a period of 2 years.	Analysis of variance yielded no overall group or treatment effects, when assessing achievement on *The Metropolitan Achievement Test*.	The teacher variable was not controlled.

TABLE II. (Continued)

Study	Modalities Studied	Subjects	Procedures	Results	Comments
Bursuk (1969)	visual, auditory-visual	90 tenth grade retarded readers	Subjects were classified to sensory modality learning preferences on the basis of discrepancy scores between the *Reading and Listening Tests* of the *Sequential Tests of Educational Progress*. Subjects were taught by an aural-visual or visual method 2¼ hours weekly for one semester.	The aural-visual approach was more effective for auditory types. Visual types learned better by a predominantly visual approach.	This study suggests that methods of presentation are still important at the grade ten level. The combination method was not successful for visiles.
Crocker (1970)	visual, visual-auditory	197 six-year olds, a number of whom had been identified as having auditory perceptual dysfunction.	Half of the sample was instructed in reading vocabulary comprehension by by the visual approach and half by the visual-aural approach for a total of 52 hours. After 2 weeks of instruction, children were given a mastery test in reading vocabulary comprehension.	One approach was not found to be superior to the other in teaching beginning reading to children with auditory dysfunction.	No mention was made of the procedures used to identify children with auditory dysfunction.

TABLE II. (Continued)

Study	Modalities Studied	Subjects	Procedures	Results	Comments
Robinson (1972)	visual, auditory	232 first graders from schools which used a sight word approach to reading and 216 first graders from a school which emphasized the Hay-Wingo Approach	Modality preference of subjects was identified by *Goins Battery of Visual Perception Tests* and the *Wepman Auditory Discrimination Test*. Subjects were randomly assigned to the phonic or sight word method of teaching for 3 years.	About 6 percent could be classified as visiles and 5 percent as audiles from the two test results. Neither the phonic or sight approach proved to be more successful with auditory or visual types.	The teacher variable was not controlled. It is questionable whether the *Goins Battery* or *Wepman* are sufficient indicators of modality preference.

V. RESEARCH STUDIES ON AUDITORY AND VISUAL INTEGRATION

Whereas many researchers have focussed on auditory and visual modalities as discreet factors, other researchers have concerned themselves with the integration of the various modalities.

Birch and Belmont (1964) hypothesized that auditory-visual integration was a basic process in learning to read. They justified this theory by stating that the task of reading involves the associating of auditory (spoken) information with visual (written) information. The experimental task they devised to investigate integration required subjects to match a pattern of events in one modality with a pattern of events in another modality. The investigator would produce an auditory pattern by tapping a pencil a number of times and the subject was required to pick out a matching visual pattern from among patterns of black dots. Their results showed significant relationships between the ability to make auditory-visual equivalence, reading ability and intelligence.

Similar studies with similar results were also concudted by Kahn and Birch (1968) and Jones (1970).

Other investigators have devised variations of Birch and Belmont's integrative task. For example Beery (1967) in a similar study presented the visual pattern first before the selection of the matching auditory pattern.

Working with dyslexic subjects he found that their ability to make comparisons between auditory and visual stimuli was lower than for average readers.

Ford (1967) studied the relation of auditory-visual integration and tactual-visual integration to intelligence and reading achievement with a sample of 121 grade four boys. The subjects were presented with a rhythmic auditory pattern tapped out by the examiner and were required to identify a visual dot pattern which matched it. In another task subjects explored a form tactually and then identified its visual counterpart. Results showed the auditory-visual test to be easier than the tactile-visual test. Significant correlations were found to exist between the auditory-visual task, reading achievement and intelligence.

Muehl and Kremenak (1966) suggested that the beginning reader needs to make four different kinds of auditory and visual sensory integrations. They stated that a beginning reader must make auditory and visual discriminations which are integrations within a modality. Two kinds of integrations between the auditory and visual senses are also required; the beginning reader must relate auditory patterns in speech to visual patterns in print and when he reads must reverse this process (pp. 230-232). The two tests they used to measure integration were similar to those of Birch and Belmont (1964); visual dot patterns and an electric telegraph key for the auditory stimulus. The subjects were required to match auditory and visual patterns within and between modes. The findings showed the visual-visual matching task to be the easiest, followed by the visual-auditory and the auditory-visual while the auditory-auditory was found to be the most difficult. Furthermore the ability to match auditory-visual and visual-auditory pairs made significant contributions, although somewhat low, towards predicting reading achievement.

These results show these studies do share comparisons; a positive correlation is found to exist between auditory-visual integration and reading ability. However, this relationship, although consistent, is usually low (Ford, 1967). Muehl and Kremenak (1966) suggest that this low relationship may be due in part to the use of non-verbal materials in the investigations. Pick (1969) suggests that "the experimental task which is constructed to study a process in reading should be as similar as possible to the relevant aspect of the reading task itself" (p. 164). It can be seen that the mechanical task of matching dots and taps has no obvious similarity to the complex reading task.

VI. AUDITORY AND VISUAL SEQUENCE FOCUS APPROACHES IN TEACHING WORD IDENTIFICATION

The author of this study is prepared to accept the modality-bound nature of children's learning behavior as a major factor in learning to read. It also seems reasonable that the reading task involves an intermodal process of relating an auditory pattern in speech to a visual pattern in print. In learning to read "children learn to associate sound-labels with visual-labels (and vice versa) on both a gestalt whole word basis and on a phoneme-grapheme analytic-synthetic basis", (Bannatyne, 1968, p. 14). Learning to read then is heavily dependent upon both the visual and auditory modalities. "The child has to turn the gestalt of letters into sounds or the gestalt of sound into letters" (Bannatyne, 1968, p. 15). Fluent readers are usually able to make instant transfers both ways (Goodman, 1968; Smith, 1971). However Wepman suggests that many poor and/or beginning readers may not possess this flexibility (1964, 1968). Although the majority of children are able to function in both visual and auditory modalities, a child's learning type - his maximal modality or pathway of learning - may profoundly affect his performance with a particular approach in reading (Wepman, 1964, 1968). Wepman further suggests that a visual emphasis in reading with immediate auditory reinforcement is appropriate for the child who shows his best ability to be visual. For the child with good auditory ability, an auditory emphasis with strong, but secondary sight training is recommended (Wepman, 1964, p. 30).

The particular sequencing of auditory and visual modalities for reading instruction rather than teaching words through one or the other modality would appear then to be fundamental to a child's success in beginning reading. It is on the sequencing of the modalities that this research focusses. The design for the study is described in the next chapter.

CHAPTER III

THE EXPERIMENTAL DESIGN

The purpose of this chapter is to describe the design, the standardized and experimental tests used, the sample selected for this study, the pilot study and the collection and analysis of data.

I. DESIGN OF THE STUDY

The main purpose of this study was to determine if low readers and high readers differed in their performance on an auditory-visual sequence focus approach and a visual-auditory sequence focus approach for word identification skills. Two lists of nonsense words were used. For each list the statistical model used was a 2 x 2 factorial design. The two levels of factor A were high and low reading achievers. The two levels of factor B were the Auditory-visual Sequence Focus Approach and the Visual-auditory Sequence Focus Approach.

Both the two teaching approaches and the two word lists were given in counterbalanced order to control for any sequence effect that might exist.

II. TESTING INSTRUMENTS

Standardized Tests

The Keystone Visual Survey Test. This is a visual screening device produced by the Keystone View Company of

Meadville, Pennsylvania, U.S.A. This test involves the use of the Keystone Telebinocular instrument and is individually administered. This instrument is designed to screen for a number of visual difficulties such as acuity and phoria at near and far point, depth perception and colour blindness. The total test consists of fourteen subtests, nine of which are placed at the far point position which is equivalent to a distance of twenty feet, and five are placed at the near point position which is equivalent to a distance of sixteen inches. Since this experimental task involved only near point visual acuity, only this was assessed. Therefore subtest twelve (Usable Vision Both Eyes), subtest thirteen (Usable Vision Right Eye) and subtest fourteen (Usable Vision Left Eye) were administered to all prospective subjects.

The Maico Individual Audiometer Test. This is an auditory screening device manufactured by Maico Electronics, Minneapolis, Minnesota. It is a portable unit, equipped with earphones. This instrument is designed to assess a person's ability to hear sounds at increasing decibel and frequency levels. The hearing loss dial regulates the intensity of each test tone. The test tones are graduated in decibel steps from slightly below normal to maximum loudness. The amount of hearing loss for low, medium or high pitches is tested by checking each test tone of intensity at the frequencies noted at the top of the panel.

The frequencies range from 125 to 8,000 cycles. The usual procedure for screening auditory acuity deficients is to test each child at fifteen decibels. However, since no soundproof room could be obtained for the administration of the test the decibel level was set at 20 for the 1,000, 2,000, 3,000, 4,000, 6,000 and 8,000 frequency cycles and was set at 25 for 500 frequency cycles since the room noises interfered with the child's ability to hear at this low frequency. Both ears were tested by this auditory screening test.

The Gates MacGinitie Reading Test, Primary A, Form 2. This reading test was chosen as the instrument to measure reading achievement. The Gates MacGinitie was selected because it has been widely used and is considered to be a reputable, reliable reading achievement test. Since this test is used by the Edmonton Catholic School System, local norms were available, if desirable, for comparison. The Primary A, Form 2 of the Gates MacGinitie has two subtests; Vocabulary and Comprehension. The Vocabulary subtest requires the subject to select one word, from a possible four, which best identifies a picture. The Comprehension subtest requires the subject to select one picture, from a possible four, which best corresponds to a short story.

The Gates MacGinitie Reading Tests manual reports reliability scores of the Comprehension subtests to be .83 (Alternate form) and .94 (Split-half). The reliability scores for the Vocabulary are reported as .86 (Alternate form) and .91 (Split-half).

III. MATERIALS CONSTRUCTED FOR THIS STUDY

Word Lists

Two lists of two syllable nonsense words were constructed. The original lists each contained nine words but were reduced to six words (for reasons given below) for the final study. All words contained six letters. In order to make the word lists as similar as possible they were constructed along two major guidelines:

Phonic elements. First a list of phonic elements was made. In the list were consonants, consonant blends, consonant digraphs, common phonograms, long vowels, short vowels, vowel digraphs, vowel dipthongs, r- controlled vowels and silent letters. This breakdown is in accord with that of Dechant (1970) and Durkin (1974). The purpose of devising a list like this was not to compare a subject's performance on words which contained different phonic elements but to ensure uniformity of phonic elements from one list to another. Also, by constructing such lists which contain phonic elements representative of words in general any conclusions resulting from this investigation would be more applicable to teaching word identification skills.

Ease of pronunciability. Pronunciability ratings from

Underwood and Schulz (1960) were then examined to see if the phonic elements were within the 239 three-letter units of pronunciability. Each of the pronunciability ratings was derived from a trigram and was given in the form of a value ranging from one to nine. A low value indicates that the trigram is easy to pronounce and a high value indicates it is hard to pronounce. The ratings of the trigram units used in this study are included in Appendix E.

Any phonic element which was not within the three-letter units was discarded. On this basis the following elements were retained and assigned to the two word lists.

Phonic Element	List I	List II
vowel dipthong	ou	oi
consonant blend	fr	sl
consonant digraph	ch	wh
common phonogram	nd	mp
'r' controlled vowel	ar	er
single consonant	b	m

Figure 1. Assignment of Phonic Elements to Word Lists I and II

Each of these elements were contained within one of two trigrams which composed each nonsense word. The second trigram was a CVC unit also taken from the pronunciability ratings.

Neutral Pictures

Each nonsense word was paired with a neutral picture; a picture without specific meaning. Appendix D includes the pictures with their corresponding nonsense words. The pictures were constructed and used by Burke (1972). Hobbs (1973) also used these neutral pictures in her study.

Final Word Lists

After the pretest of word recognition the number of words in each list was reduced to six on the basis of the pretest for the main study when certain words were pronounced by the subjects. The word pronounced and its corresponding word from the other list were eliminated. The final word lists are included in Appendix C.

Sequence Focus Approaches

In the *Auditory-visual Sequence Focus Approach* the subject was exposed to the words auditorially before he encountered them visually whereas in the *Visual-auditory Sequence Focus Approach* the subject was exposed to the words visually before he encountered them auditorially. At the end of each teaching procedure, the subjects were tested on their identification or pronunciation of the words. The detailed directions for each approach may be found in Appendix F .

Scoring Procedures

There were four measures of identification for each word. The first measure was successful pronunciation of the entire word. The second was the correct pronunciation of the first syllable and the third was correct pronunciation of the second syllable. Each of these measures for each word received a score of one giving an entire word score of six, a first syllable score of six and a second syllable score of six for each word list. A phoneme score was also included in the word identification measures. There were thirty-four phonemes in each list giving a phoneme count of thirty-four. The only restriction on the phonemic identification was that the phonemes be identified in their correct sequence. Insertions would not detract from the final score. For example, if a subject pronounced kitalar for kitlar he would still receive the full score of six. If a phoneme was omitted, the score would be one less. For example, if a subject pronounced kitlar as kitar, he would receive a score of five. If he instead pronounced it as kar he would receive a score of three. If, however, he pronounced it as kiral or kilt he would receive a score of two because the phonemes were not identified in their correct sequence.

IV. THE SAMPLE

The test population for this study consisted of four grade one classes in two schools assigned to the investigator by the Edmonton Catholic School Board. The total enrollment in these schools for grade one was 104. The sample consisting of forty-eight students was selected according to the following criteria:

Grade Level

Grade one children were chosen as subjects since it was felt that information concerning methods of teaching word identification skills would be of particular relevance for initial reading instruction. Also the test results would, at this early time in their educational careers, be more representative of children's learning styles and therefore less influenced by various teaching methodologies. Furthermore, if differences were found to exist between the A-V and V-A Approaches for low and/or high readers such information would be of greater value at these initial stages of reading.

Reading Achievement

It was considered important to discover if reading achievement played a role in the subjects' performance on the Auditory-visual Sequence Focus Approach or the Visual-auditory Sequence Focus Approach. Therefore, the sample was restricted to those subjects who scored above or below one-half a standard deviation on the mean standard score (the average of the Vocabulary and Comprehension standard scores) on the Gates MacGinitie Reading Test, Primary A, Form 2. The raw scores ranged from thirty-three to seventy-four, twenty-eight being the lowest possible score and seventy-four the highest possible score. The mean score was

56.27. Of the ninety-four children who took this test, thirty-five were classified as high readers and thirty were classified as low readers. The middle readers were eliminated leaving sixty-five from which to choose the sample.

Chronological Age

The sample did not include children repeating grade one. Although age was not used as a limiting criterion for selection of the sample, the students' ages in months were recorded for statistical correlations. The ages of the final sample ranged from sixty-nine to eighty-seven months with a mean month age of 79.83.

Auditory Acuity

Hearing efficiency was controlled by limiting the sample to those children whose hearing fell within the normal range as measured by an auditory screening test. On the basis of this test three children were eliminated from the sample and referred for further testing. Thirty-four high readers and twenty-eight low readers remained eligible for the sample.

Visual Acuity

Visual efficiency was controlled by limiting the sample to those children whose vision fell within the acceptable range for near point acuity as measured by the visual screening test. On the basis of this test three children were eliminated from the sample and referred for analysis which then left thirty-three high readers and twenty-six low readers eligible for the sample.

Pretest of Word Identification

Two weeks before the final study a pretest of word identification for the nonsense word items was individually administered to each child. The words were written in primary type and each child was given five seconds to pronounce each word. Seven children, all high readers successfully pronounced one or more of the nonsense word items. Since one of the words was correctly pronounced by six children it was decided to eliminate this word rather than all six children. When this word was discarded, its corresponding word in List II was also discarded. Three children correctly pronounced other items and were therefore eliminated from the study along with one high reader and one poor reader who were absent for the test.

The remaining group consisted of twenty-four low readers, one having moved and twenty-nine high readers. A random selection of five good readers was eliminated leaving equal numbers of high and low readers in the sample.

Present Reading Methodology

All the four classes from which the sample was selected were using the Gage Language Experience Approach. Supplemental materials used were: the Nelson Language

Development Reading Program (1970), the Ginn Basic Readers (1957) and the Phonics Workbook (Book A) by Elwell, Murray and Kucia.

Table III contains descriptive data on the study sample. Further data on the sample may be found in Table XXIV in Appendix A.

TABLE III

SUMMARY OF DESCRIPTIVE DATA FOR THE FINAL SAMPLE OF HIGH AND LOW READERS

	Sex	Mean C.A.	Mean Reading Score	Approximate Grade Equivalent of Reading Score
High Readers	14-M 10-F	79.4	65.5	2.5
Low Readers	15-M 9-F	80.2	46.3	1.4

V. PILOT STUDY

A pilot study was conducted in February, 1974 with eight grade one students in an elementary school of the Edmonton Catholic School System. The students were three high and five low readers based on their teacher's ratings. The purposes of the pilot study were to assess the difficulty of the word items; to determine the suitability of the test instructions and procedures, and to assess the amount of time needed for the final study.

Information gathered in the pilot study led to more simplified instructional procedures. The word items in the pilot did not change since they were not identified in the pretest of word identification. The time required for the administration of the experimental task was approximately fifteen minutes per child. The results indicated that both high and low readers performed higher on the Visual-auditory Sequence Focus Approach than on the Auditory-visual Sequence Focus Approach.

VI. COLLECTION OF THE DATA

The Gates MacGinitie Reading Test, Primary A, Form 2 was administered to all children present in the four grade one classes. The investigator administered the tests with the aid of one staff member within one school. The testing was conducted during regular class hours on two different occasions for each class of students.

A registered nurse administered the visual and auditory screening tests to the thirty-four high readers and twenty-eight low readers designated by the results from the Gates MacGinitie Reading Test. Both screening tests were individually administered to each child. The combined time required for both tests for each child was approximately fifteen to twenty minutes.

Two weeks before the main study the Pretest of Word Identification was individually administered to each child. Administration time was approximately three minutes for each child.

The final group of forty-eight subjects who possessed satisfactory acuity and had not correctly identified words on the Pretest of Word Identification were then divided into the two groups of high and low readers. Since there were two word lists, each subject was taught by the Auditory-visual Sequence Focus Approach for one list and the Visual-auditory Sequence Focus Approach for the other. There was a two week time period between the first and second testing sessions.

The subjects were arranged for test administration in the manner displayed in Figure 2.

	First Teaching Approach and First Word List	Second Teaching Approach and Second Word List
Group I-6 high readers 6 low readers	A-V List I	V-A List II
Group II-6 high readers 6 low readers	V-A List I	A-V List II
Group III-6 high readers 6 low readers	A-V List II	V-A List I
Group IV-6 high readers 6 low readers	V-A List II	A-V List I

Figure 2. Administration of the Teaching Approaches and Word Lists for High and Low Readers.

VII. ANALYSIS OF THE DATA

The data were analyzed according to the following statistical procedures:

Two Way Analysis of Variance (ANOV 25)

Four two-way analyses of variance were used to determine if differences existed between the reading groups and the teaching approaches on the four measures of identification; entire word, first syllable, second syllable and phoneme count for List I words. Also, four two-way analysis of variance were used for the same purposes for List II words.

The Scheffe Method of Multiple Comparisons

Scheffe tests were used to reveal where significant differences between means lay for both high and low reading groups for word identification of:

(a) A-V Approach vs. V-A Approach, List I for the four measures of word identification; entire word, first syllable, second syllable and phoneme count.

(b) A-V Approach vs. V-A Approach, List II for the four measures of word identification; entire word, first syllable, second syllable and phoneme count.

Pearson Product-Moment Correlation

This procedure was used to determine if a linear relationship existed:

(a) between all variables for high readers who received the A-V Approach, List I Words and the V-A Approach, List II Words

(b) between all variables for high readers who received the A-V Approach, List II Words and the V-A Approach, List I Words

(c) between all variables for low readers who received the A-V Approach, List I Words and the V-A Approach, List II Words

(d) between all variables for low readers who received the A-V Approach, List II Words and the V-A Approach, List I Words.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF TEST DATA

The purpose of this chapter is to present and discuss the analysis of data under the following headings:

I. Performance on the Auditory-visual Sequence Focus (A-V) Approach and the Visual-auditory Sequence Focus (V-A) Approach, List I.

II. Differences between high and low readers on the A-V Approach and V-A Approach, List I.

III. Performance on the A-V and V-A Approaches, List II.

IV. Differences between high and low readers on the A-V Approach and V-A Approach, List II.

V. Correlations of subjects' performance on the A-V Approach and the V-A Approach.

VI. Differences between the performance of high readers and low readers on List I and List II.

VII. Summary of findings.

I. PERFORMANCE ON THE A-V AND V-A APPROACHES, LIST I

Equal numbers of high and low readers, for a total of one-half of the total sample, received the A-V Approach, List I while the remaining half received the V-A Approach, List I. The results of these two tests are shown in

Tables IV and V in terms of possible score, mean total group score, mean high reader score and mean low reader score.

TABLE IV

MEAN SCORES OF HIGH AND LOW READERS ON THE A-V APPROACH, LIST I

Auditory-visual Approach	Total Possible Score	Total Group Mean Score	High Reader Mean Score	Low Reader Mean Score
Entire Word	6.00	2.92	4.83	1.00
First Syllable	6.00	3.71	5.08	2.33
Second Syllable	6.00	3.21	5.25	1.17
Phoneme Count	34.00	22.88	31.25	14.50

Entire Word

The mean score for the total group indicates that approximately three of the six words in List I were pronounced correctly by the subjects. A closer look at the scores shows high readers had a mean score close to five while the low readers' mean score was only one.

First Syllable

The total group mean score indicates that while some subjects were not able to correctly identify the entire word, more were able to identify the first syllable. The scores also show that this increase in mean score was due primarily to the low readers whose score increased considerably from the entire word score. High readers' mean score, although greater, did not show such a dramatic increase.

Second Syllable

The total group mean score showed an increase from the entire word score but a decrease from the first syllable score. The high readers' relatively high mean score of 5.25 suggests that high readers correctly identified the second syllable more often than the first syllable or entire word. Low readers, on the other hand, although showing a slight increase from the entire word score, identified the second syllable far less often than the first.

Phoneme Count

The mean score of 22.88 indicates that readers as a total group were able to identify over two-thirds of the thirty-four phonemes. The mean score of 31.25 shows that high readers were able to identify the majority of phonemes. Low readers correctly identified one-half of the phonemes, a higher score than for the first and second syllable or entire word scores.

An examination of the total range of scores shows that high readers performed much higher than did low readers on the four measures of identification.

The analysis of data on the Visual-auditory Sequence

Focus Approach, List I is given in Table V and is described under the headings below.

TABLE V

MEAN SCORES OF HIGH AND LOW READERS ON THE V-A APPROACH, LIST I

Visual-auditory Approach	Total Possible Score	Total Group Mean Score	High Reader Mean Score	Low Reader Mean Score
Entire Word	6.00	2.92	3.50	2.33
First Syllable	6.00	4.09	4.75	3.42
Second Syllable	6.00	3.58	4.00	3.17
Phoneme Count	34.00	25.92	28.25	23.58

Entire Word

The total group mean score was the same as the mean score for the V-A Approach, List I. However, a closer look at the scores shows that high readers' scores have decreased by the correct identification of an average of 1.33 words while low readers' scores have increased by an average of 1.33 words in the V-A Approach.

First Syllable

The total group mean score for first syllables was greater than for the entire word score, as in the A-V Approach. Both high and low readers' scores contributed to this gain. The first syllable score was lower for high readers but higher for low readers than was the first syllable mean score for the A-V Approach.

Second Syllable

The total group mean score was lower for the second syllable than for the first. This trend also existed in the A-V Approach. However, unlike the A-V Approach, high readers' mean score for the second syllable was lower than the mean score for the first syllable. Low readers, as in the A-V Approach exhibited lower scores, although the decrease was not as dramatic in the V-A Approach.

Phoneme Count

The phoneme count for the total group was slightly higher than in the A-V Approach. Following the same trend as in the previous measures of word identification, high readers' mean score decreased from the A-V Approach to the V-A Approach while low readers' mean score showed an increase.

A comparison of the total scores from the A-V Approach and the V-A Approach shows that total group mean scores for the V-A Approach were higher than mean scores for the A-V Approach and high readers always scored higher than low readers, regardless of the approach. However, high readers achieved consistently lower in the V-A Approach while low readers achieved consistently higher in the V-A Approach.

II. DIFFERENCES BETWEEN HIGH AND LOW READERS ON THE A-V APPROACH AND THE V-A APPROACH, LIST I

The relationship between performance on the A-V Approach and the V-A Approach, List I was further analyzed by performing four two-way analyses of variance with reading achievement as Factor A and teaching approach as Factor B, to determine any significant differences between high and low readers on the two teaching approaches. Tables VI, VII, VIII and IX present summaries of these analyses for entire word, first syllable, second syllable and phoneme identification, respectively. The first measure of identification was entire word identification presented in Table VI.

TABLE VI

SUMMARY OF ANALYSIS OF VARIANCE WHEN CONSIDERING ENTIRE WORD IDENTIFICATION FOR HIGH AND LOW READERS AND A-V AND V-A APPROACHES, LIST I

Source of Variation	SS	DF	MS	F
Reading Approaches	0.00	1	0.00	0.00
Reading Ability	74.99	1	74.99	50.51**
Approach X Ability	21.33	1	21.33	14.37**
Error	65.33	44	1.48	

** Significant at the .01 level

The results of the analysis of variance revealed a difference between high and low readers that reached significance at the .01 level. Although the results showed no difference between reading approaches for the total readers, interaction was observed between teaching approaches and reading achievement that reached significance at the .01 level. The interaction effect is illustrated in the graph in Figure 3.

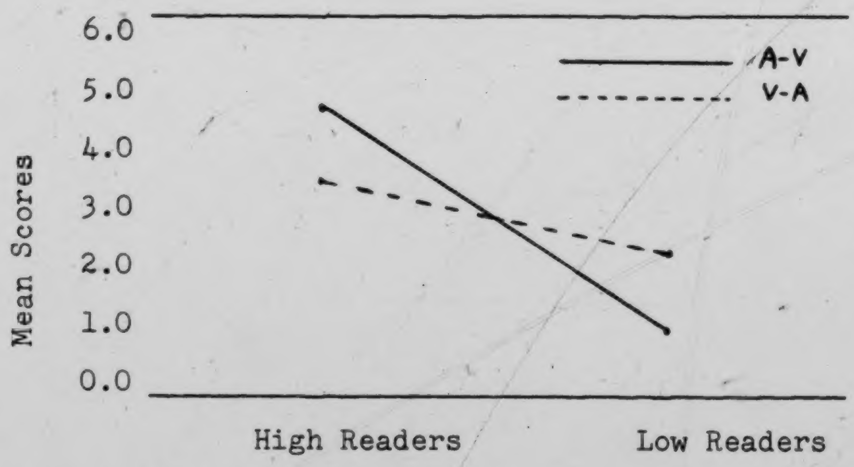


Figure 3. Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List I - Entire Word

It can be observed that reading approaches did appear to make a difference for high and low readers in entire word identification, the A-V Approach being higher for high readers and the V-A Approach being higher for low readers.

The second measure of word identification for the

A-V and V-A Approaches, first syllable identification, is presented in Table VII.

TABLE VII

SUMMARY OF ANALYSIS OF VARIANCE WHEN CONSIDERING FIRST SYLLABLE IDENTIFICATION FOR HIGH AND LOW READERS AND A-V AND V-A APPROACHES, LIST I

Source of Variation	SS	DF	MS	F
Reading Approaches	1.68	1	1.68	.99
Reading Ability	50.02	1	50.02	29.44**
Approach X Ability	6.02	1	6.02	3.54
Error	74.75	44	1.70	

** Significant at the .01 level

The analysis revealed a difference at the .01 level of significance between high and low readers for the A-V and V-A Approaches. The analysis showed no significant difference between approaches for total readers. Since the critical value of F needed for a .05 level of significance was 4.02, the interaction of achievement and reading approach, with an F value of 3.54, failed to reach statistical significance. However, a graph (Figure 4) was constructed to illustrate the differences between mean scores for high and low readers.

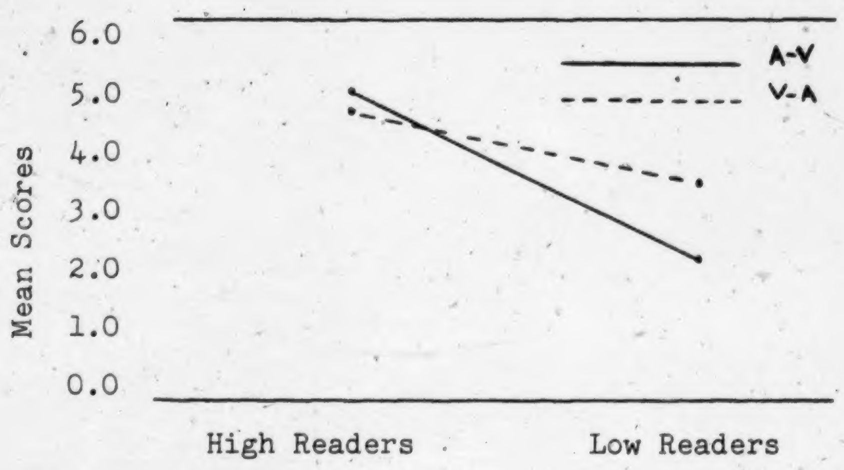


Figure 4. Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List I - First Syllable.

Once again it is obvious that reading approaches did appear to make a difference for low readers in first syllable identification, the score on the V-A Approach being higher than the corresponding score on the A-V Approach. High readers' scores, on the other hand, did not suggest such a difference.

The third measure of identification, second syllable identification, for the A-V and V-A Approaches, List I, is presented in Table VIII.

TABLE VIII

SUMMARY OF ANALYSIS OF VARIANCE WHEN CONSIDERING SECOND SYLLABLE IDENTIFICATION FOR HIGH AND LOW READERS AND A-V AND V-A APPROACHES, LIST I

Source of Variation	SS	DF	MS	F
Reading Approaches	1.69	1	1.69	1.49
Reading Ability	72.52	1	72.52	64.35**
Approach X Ability	31.69	1	31.69	28.12**
Error	49.58	44	1.13	

** Significant at the .01 level

The analysis revealed a difference between high and low readers significant at the .01 level. The extremely high F value; 64.35, suggests that low readers found the second syllable much more difficult to identify than did high readers. As in the analysis of variance for entire word identification, this analysis showed no significant difference between methods and total readers but did reveal significant interaction. This interaction is illustrated in the graph in Figure 5.

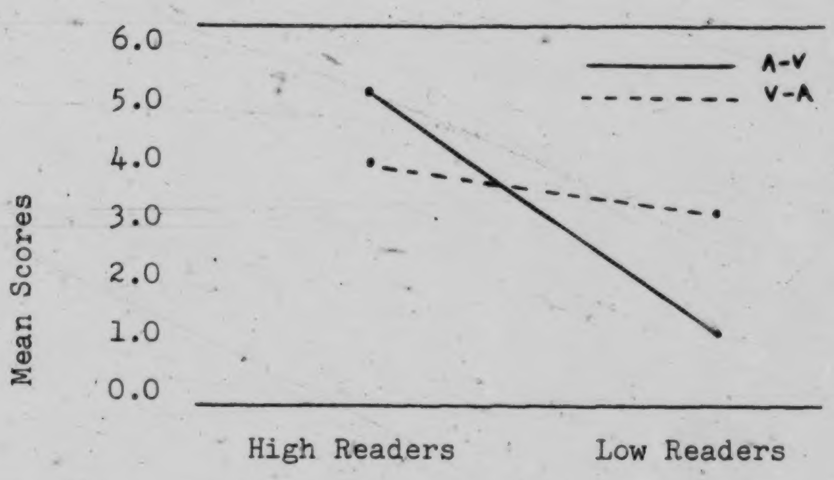


Figure 5. Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List I - Second Syllable

The graph suggests that reading approaches appeared to make a difference for both high and low readers in their identification of the second syllable of a word. The V-A Approach appeared to be much higher for low readers while the A-V Approach appeared to be higher for the high readers.

The fourth measure of identification, phoneme count, is presented in Table IX.

TABLE IX

SUMMARY OF ANALYSIS OF VARIANCE WHEN CONSIDERING PHONEME IDENTIFICATION FOR HIGH AND LOW READERS AND A-V AND V-A APPROACHES, LIST I

Source of Variation	SS	DF	MS	F
Reading Approaches	111.02	1	111.02	3.37
Reading Ability	1376.03	1	1376.03	41.80**
Approach X Ability	438.02	1	438.02	13.30**
Error	1448.42	44	32.92	

** Significant at the .01 level

The analysis revealed a difference between reading achievers significant at the .01 level. Interaction between teaching approaches and reading achievement was significant at the .01 level. To lucidate the interaction effects the graph in Figure 6 is presented.

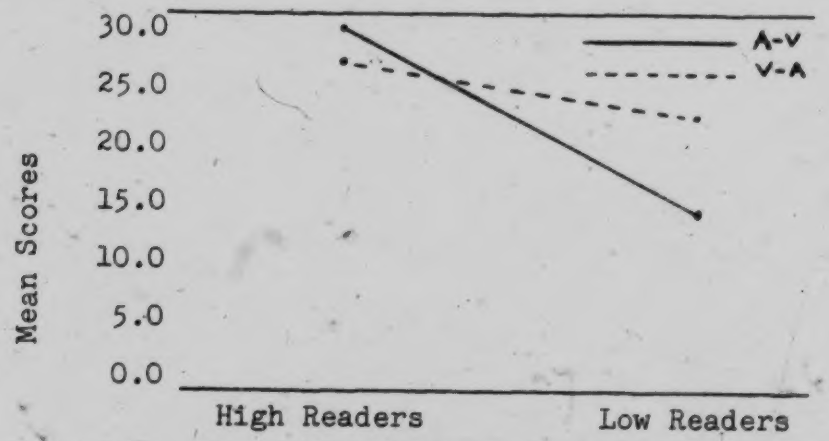


Figure 6. Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List I - Phoneme Count.

The graph shows a difference in approaches for the low readers, the V-A Approach being higher. There appeared to be little difference in approaches for high reading achievers in phoneme identification.

To determine if the interaction effects between the V-A and A-V Approaches, List I and high and low readers revealed by the analyses of variance for entire word, first syllable, second syllable and phoneme identification were statistically significant necessitated further analysis. The mean scores of the A-V Approach were compared to the mean scores of the V-A Approach, on the four measures of identification for high readers and for low readers by Scheffé multiple comparison tests. The data for high readers is shown in Table X.

TABLE X

SCHEFFÉ'S MULTIPLE COMPARISON OF MAIN EFFECTS BETWEEN A-V AND V-A APPROACHES FOR HIGH READERS, LIST I

High Readers	$\bar{X}_1$(A-V)	$\bar{X}_2$(V-A)	$(\bar{X}_1-\bar{X}_2)^2$	MSe	F
Entire Word	4.83	3.50	1.77	1.48	7.18*
First Syllable	5.08	4.75	.11	1.70	.39
Second Syllable	5.25	4.00	1.56	1.13	8.32**
Phoneme Count	31.25	28.25	9.00	32.92	1.64

** Significant at the .01 level
* Significant at the .05 level

This comparison showed that the difference between the A-V and V-A Approaches for entire word scores was significant at the .05 level. The A-V Approach was statistically superior for high readers on this measure of word identification. First syllable comparisons showed no statistical difference between the A-V and V-A Approaches. The first syllable was identified almost equally well with both approaches. However, the second syllable was identified more frequently via the A-V Approach. The relatively high F value for the second syllable measure suggests that the superiority of the A-V Approach was due primarily to successful identification of the second syllable. Both approaches showed similar results for the first syllable but for the second syllable the A-V Approach revealed superior results. There was no significant difference between approaches for the phoneme count suggesting that the superiority of the A-V Approach was not due primarily to the identification of individual phonemes within words. Phonemic scores between the approaches were very similar suggesting that the differences between the approaches do not exist at this low level of identification. The superiority of the A-V Approach over the V-A Approach was best illustrated in entire word identification.

TABLE XI

SCHEFFÉ'S MULTIPLE COMPARISON OF MAIN EFFECTS BETWEEN A-V AND V-A APPROACHES FOR LOW READERS, LIST I

Low Readers	$\overline{X}_1$(A-V)	$\overline{X}_2$(V-A)	$(\overline{X}_1-\overline{X}_2)^2$	MSe	F
Entire Word	1.00	2.33	1.77	1.48	7.18*
First Syllable	2.33	3.42	1.17	1.70	4.14*
Second Syllable	1.17	3.17	4.00	1.13	21.30**
Phoneme Count	14.50	23.58	82.45	32.91	15.04**

** Significant at the .01 level
* Significant at the .05 level

The comparative data between approaches for low readers are shown in Table XI and indicate a difference, significant at the .05 level, between the A-V Approach and the V-A Approach, List I for entire word and first syllable identification. This preference for the V-A Approach, List I was contrary to that of the high readers who scored higher on the A-V Approach. Continuing the trend of superior results for the V-A Approach, low readers demonstrated a preference for the V-A Approach in second syllable and phoneme identification significant at the .01 level. The superiority of the V-A Approach for low readers was particularly noticeable in the high F value for second syllable identification. The high F value for second syllable difference was also observed for high readers only they exhibited a preference for the A-V Approach.

In summary, high readers demonstrated a preference for the A-V Approach, List I with the measure of entire word identification being significant at the .05 level and the measure of second syllable identification being significant at the .01 level. Low readers demonstrated a preference for the V-A Approach, List I with the measures of entire word and first syllable identification being significant at the .05 level and the measures of second syllable and phoneme identification being significant at the .01 level.

III. PERFORMANCE ON THE A-V AND V-A APPROACHES, LIST II

Each subject in the sample received either the A-V or V-A Approach with List I words. Each subject also received either the A-V or V-A Approach with List II words. For example, if subject A received A-V Approach, List I words then he would receive V-A Approach, List II words two weeks later. As in List I, equal numbers of high and low readers, one-half of the total sample received the A-V Approach, List II while the remaining half received the V-A Approach, List II. The results of these two tests are shown in Tables XII and XIII in terms of possible score, mean total group score, mean high reader score and mean low reader score.

TABLE XII

MEAN SCORES OF HIGH AND LOW READERS ON THE A-V APPROACH, LIST II

Auditory-Visual Approach	Total Possible Score	Total Group Mean Score	High Reader Mean Score	Low Reader Mean Score
Entire Word	6.00	3.21	4.58	1.83
First Syllable	6.00	3.67	4.92	2.42
Second Syllable	6.00	3.67	5.08	2.25
Phoneme Count	34.00	23.71	30.17	17.25

Entire Word

The mean score of 3.21 for the total group indicates that somewhat over three words were identified correctly by all subjects. High readers' mean score was approximately four and one-half words while low readers' mean score was somewhat less than two words.

First Syllable

The total group mean score of 3.67 shows that some high and low readers were able to identify the first syllable, although not the entire word. However, the mean increase was less than half a word suggesting that this increase may not be statistically different. However, low readers' mean increase from their entire word score was higher than high readers' mean increase.

Second Syllable

The total group mean score was the same as for the first syllable, indicating that the total group found the second syllable equally difficult to identify. A closer look showed that high readers' scores increased slightly while low readers' scores decreased slightly from first syllable mean scores.

Phoneme Count

The total group mean score of 23.71 indicates that approximately two-thirds of the phonemes were identified by the total group. High readers had a relatively high phoneme count suggesting that incorrect identifications in entire word or syllable measures were due to incorrect identifications of approximately one phoneme per word.

Looking at the total range of scores, high readers consistently performed higher than low readers. High readers achieved higher results in the second syllable measure as opposed to the first while opposite results occurred for low readers. The mean scores of first and second syllable measures were the same, being somewhat higher than entire word mean scores showing that readers, do, at times, identify one syllable correctly yet fail to identify the other.

TABLE XIII

MEAN SCORES OF HIGH AND LOW READERS ON THE V-A APPROACH, LIST II

Visual-auditory Approach	Total Possible Score	Total Group Mean Score	High Reader Mean Score	Low Reader Mean Score
Entire Word	6.00	2.21	3.33	1.08
First Syllable	6.00	2.79	3.83	1.75
Second Syllable	6.00	2.88	4.33	1.42
Phoneme Count	34.00	19.25	26.58	11.92

The data from Table XIII are discussed under the following headings.

Entire Word

Both high and low readers' mean scores were lower in the V-A Approach than in the A-V Approach. High readers' mean score was lower by an average of 1.25 words correctly identified while low readers' score was lower by an average of .75 words correctly identified suggesting that both groups of readers found the V-A Approach more difficult.

First Syllable

As in the A-V Approach, both high and low readers' mean scores increased from their entire word mean score although low readers showed a greater average increase in first syllable pronunciations; .67, as compared to .50 for the high readers.

Second Syllable

The total group mean score was somewhat higher than the first syllable score. This increase was due to high readers whose mean score increased by an average of .50 correct identifications. On the other hand, low readers' score decreased by .33 correct identifications. This trend was also shown in the A-V Approach where high readers performed better on the second syllable measure and low readers better on the first.

Phoneme Count

Both high and low readers' mean scores were lower on the V-A Approach than on the A-V Approach. This lower score was consistent with the three previous measures of word identification.

An examination of the total scores from the A-V Approach and the V-A Approach, List II indicates that the A-V Approach appeared to be preferred by all readers. High readers' mean scores were especially high in the A-V Approach, List II. However, low readers' mean scores did not show such a dramatic increase from the V-A to the A-V Approach.

IV. DIFFERENCES BETWEEN HIGH AND LOW READERS ON THE A-V AND THE V-A APPROACH, LIST II

As with List I the relationship between performance on the A-V Approach and the V-A Approach, List II was analyzed further by performing four two-way analyses of variance. Factor A was reading achievement while Factor B was teaching approach. The first measure of identification for the A-V and V-A Approaches, List II was entire word identification, presented in Table XIV.

TABLE XIV

SUMMARY OF ANALYSIS OF VARIANCE WHEN CONSIDERING ENTIRE WORD IDENTIFICATION FOR HIGH AND LOW READERS AND A-V AND V-A APPROACHES, LIST II

Source of Variation	SS	DF	MS	F
Reading Approaches	12.00	1	12.00	8.23**
Reading Ability	75.00	1	75.00	51.43**
Approach X Ability	.75	1	.75	.51
Error	64.17	44	1.46	

** Significant at the .01 level

The analysis revealed a difference at the .01 level of significance between high and low readers. The difference between reading methods was significant also at the .01 level. No interaction effect was noted indicating that one method was preferred by both types of readers. The lack of interaction is illustrated in the graph in Figure 7.

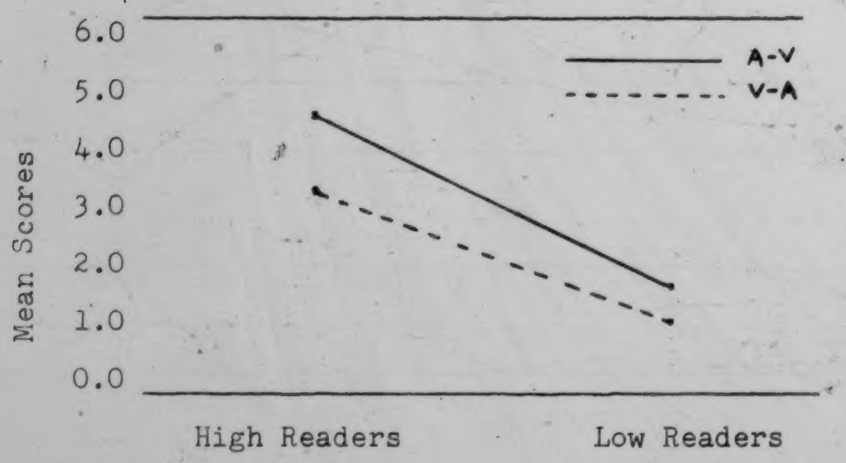


Figure 7. Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List II - Entire Word.

The graph shows that the A-V Approach, List II had superior results for both high and low readers.

The second measure of word identification, first syllable score, is presented in Table XV.

TABLE XV

SUMMARY OF ANALYSIS OF VARIANCE WHEN CONSIDERING FIRST SYLLABLE IDENTIFICATION FOR HIGH AND LOW READERS AND A-V AND V-A APPROACHES, LIST II

Source of Variation	SS	DF	MS	F
Reading Approaches	9.19	1	9.18	6.14*
Reading Ability	63.02	1	63.02	42.17**
Approach X Ability	.52	1	.52	.35
Error	65.75	44	1.49	

** Significant at the .01 level
* Significant at the .05 level

The analysis revealed a difference at the .01 level of significance between high and low readers. The difference between reading approaches, significant at the .05 level, for first syllable identification suggests that differences between the A-V and V-A Approaches were not as profound as in entire word identification. The graph in Figure 8 illustrates this effect.

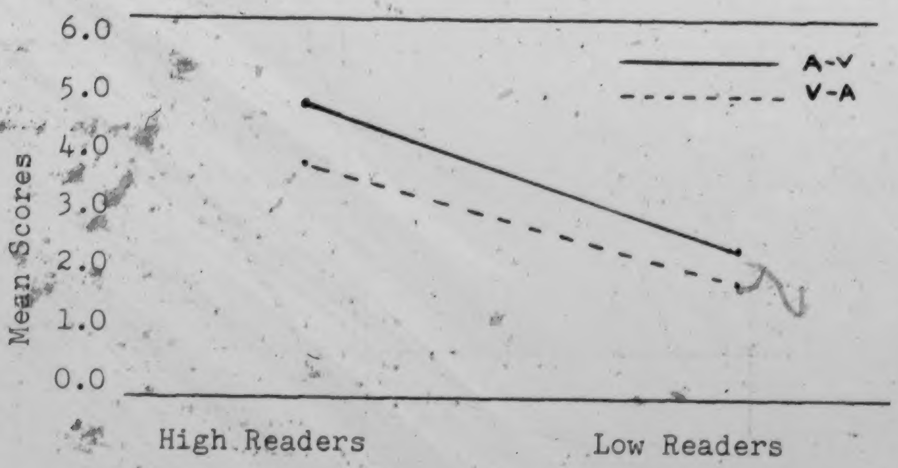


Figure 8. Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List II - First Syllable

As in entire word identification, it was observed that the A-V Approach achieved superior results for first syllable identification for both high and low readers.

Data on second syllable identification are presented in Table XVI.

TABLE XVI

SUMMARY OF ANALYSIS OF VARIANCE WHEN CONSIDERING SECOND SYLLABLE IDENTIFICATION FOR HIGH AND LOW READERS AND A-V AND V-A APPROACHES, LIST II

Source of Variation	SS	DF	MS	F
Reading Approaches	7.52	1	7.52	4.20*
Reading Ability	99.18	1	99.18	55.41**
Approach X Ability	.02	1	.02	.01
Error	78.75	44	1.79	

** Significant at the .01 level
* Significant at the .05 level

A difference at the .01 level of significance between high and low readers was revealed. A difference at the .05 level of significance between reading approaches was observed. This relatively small F value of 4.20 suggests that reading approaches do not make as significant a difference for second syllable identification as they do for entire word or first syllable identification. This effect is noted in the graph in Figure 9.

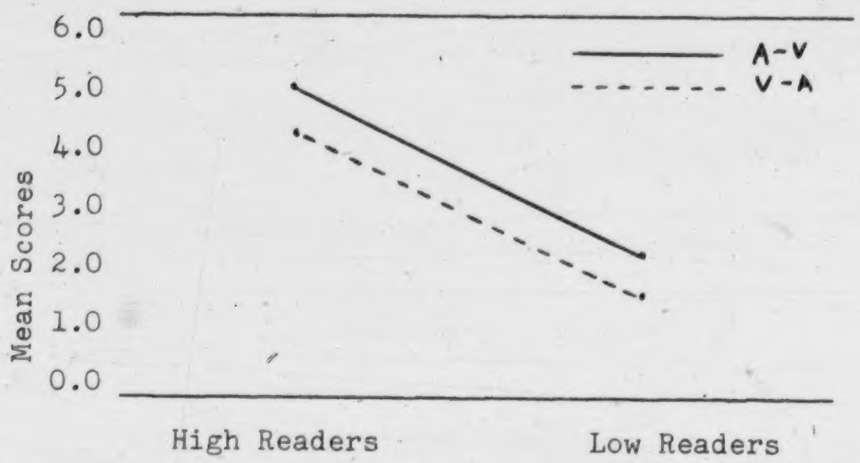


Figure 9. Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List II - Second Syllable

As with the two previous measures of word identification, the A-V Approach demonstrated significantly higher results than did the V-A Approach for second syllable identification.

Results of the fourth measure of identification, phoneme count, are given in Table XVII.

TABLE XVII

SUMMARY OF ANALYSIS OF VARIANCE WHEN CONSIDERING PHONEME IDENTIFICATION FOR HIGH AND LOW READERS AND A-V AND V-A APPROACHES, LIST II

Source of Variation	SS	DF	MS	F
Reading Approaches	238.53	1	238.53	5.97*
Reading Ability	2282.54	1	2282.54	57.14**
Approach X Ability	9.18	1	9.18	.23
Error	1757.75	44	39.94	

** Significant at the .01 level
* Significant at the .05 level

The trend existing in the preceding measures of identification continued with phoneme identification, a difference at the .01 level of significance between high and low readers being observed. A difference at the .05 level of significance was revealed between the A-V Approach and the V-A Approach. The difference between approaches for phoneme count with an F value of 5.97 appeared to be greater than the difference between approaches for second syllable identification, but lower than first syllable and entire word identification. This effect can be observed in the graph in Figure 10.

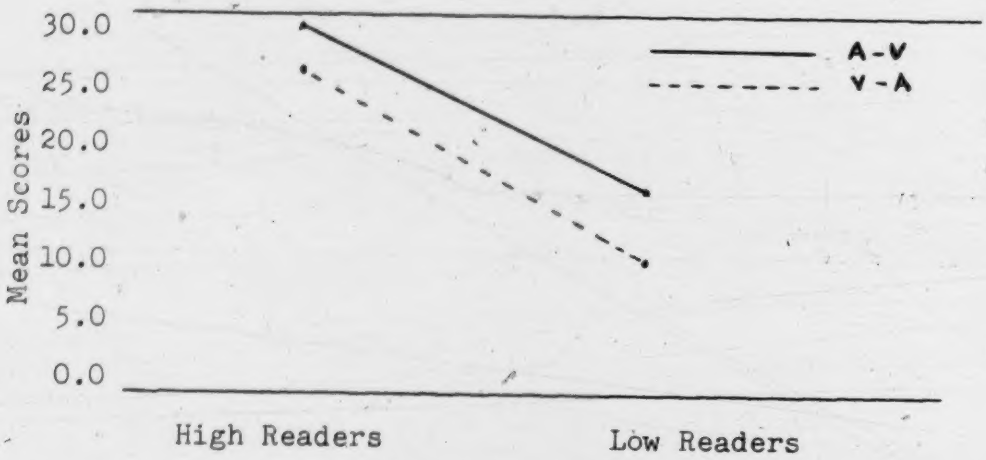


Figure 10. Comparison of Mean Scores for High and Low Readers for A-V and V-A Approaches, List II - Phoneme Count

As with the previous three measures of identification, the A-V Approach for phoneme identification contributed to higher results for both high and low readers.

To determine if the differences between the A-V and V-A Approaches, List II and high and low readers were statistically significant necessitated further analysis. The mean scores of the A-V Approach were compared to the mean scores of the V-A Approach on the four measures of identification for high readers and for low readers by Scheffé multiple comparison tests. The data for high readers are given in Table XVIII.

TABLE XVIII

SCHEFFÉ'S MULTIPLE COMPARISON OF MAIN EFFECTS BETWEEN A-V AND V-A APPROACHES FOR HIGH READERS, LIST II

High Readers	$\overline{X}_1$(A-V)	$\overline{X}_2$(V-A)	$(\overline{X}_1-\overline{X}_2)^2$	MSe	F
Entire Word	4.58	3.33	1.56	1.46	6.43*
First Syllable	4.92	3.83	1.17	1.50	4.71*
Second Syllable	5.08	4.33	.56	1.79	1.89
Phoneme Count	30.17	26.58	12.89	39.95	1.93

* Significant at the .05 level

The comparison shows that the difference between the A-V and V-A Approaches for entire word identification was significant at the .05 level. Therefore the A-V Approach was superior for high readers in entire word identification.

The A-V Approach was also superior for high readers in the identification of the first syllable, the difference between the approaches being significant at the .05 level.

Although the difference between reading approaches was not statistically significant for second syllable and phoneme identification, the trend towards higher identification scores with the A-V Approach still continued.

The small difference between approaches at the phonemic level indicates that an average of only three to four correct phoneme identifications separated the A-V from the V-A Approach. The results of the Scheffé comparisons indicate that the strength of the A-V Approach, List II for high readers was mainly due to entire word and second syllable identification scores.

TABLE XIX

SCHEFFÉ'S MULTIPLE COMPARISON OF MAIN EFFECTS BETWEEN A-V AND V-A APPROACHES FOR LOW READERS, LIST II

Low Readers	$\overline{X}_1$(A-V)	$\overline{X}_2$(V-A)	$(\overline{X}_1-\overline{X}_2)^2$	MSe	F
Entire Word	1.83	1.08	1.56	1.46	2.31
First Syllable	2.42	1.75	.44	1.50	1.78
Second Syllable	2.25	1.42	.69	1.79	2.33
Phoneme Count	17.25	11.92	28.40	39.95	4.27*

* Significant at the .05 level

The data on differences between approaches for List II are shown in Table XIX and indicate that the difference between the A-V Approach and V-A Approach, List II for entire word, first syllable and second syllable identification was not statistically significant at the .05 level for low readers. However, a difference, significant at the .05 level, was revealed in phoneme identification.

Although only phoneme identification revealed a significant difference between reading approaches, the A-V Approach had higher actual scores for entire word, first syllable and second syllable identification for low readers. This trend also existed for high readers although their preference for the A-V Approach revealed more statistical significances.

V. CORRELATIONS OF SUBJECTS' PERFORMANCE ON THE A-V APPROACH AND THE V-A APPROACH

Pearson product-moment correlations were used to indicate probabilities and significance levels of the relationships between the four measures of identification for the A-V Approach and the V-A Approach. Since the subjects received the reading approaches and the word lists in counterbalanced order two combinations of approaches and lists were possible:

(a) A-V Approach - List I Words and V-A Approach - List II Words or

(b) V-A Approach - List I Words and A-V Approach - List II Words.

The correlation matrices are presented in the preceding manner and are further subdivided for high and low readers.

TABLE XX

CORRELATIONS OF IDENTIFICATION SCORES FOR A-V APPROACH, LIST I AND V-A APPROACH, LIST II FOR HIGH READERS

		Auditory-visual Approach, List I			
		Entire Word	First Syllable	Second Syllable	Phoneme Count
Visual-auditory Approach, List II	Entire Word	-.02	-.03	-.20	-.29
	First Syllable	.11	.17	-.13	-.17
	Second Syllable	.32	.24	.31	.12
	Phoneme Count	.37	.35	.29	.12

The analysis of data in Table XX shows that scores achieved on the four measures of identification for the A-V Approach, List I did not correlate significantly with any identification measures for the V-A Approach, List II. The failure of the A-V Approach, List I to show a significant relationship with the V-A Approach, List II indicates that performance on the two approaches are quite independent of each other. This fact gives support to the earlier findings (Table X) where high readers demonstrated a preference for the A-V Approach, List I.

TABLE XXI

CORRELATIONS OF IDENTIFICATION SCORES FOR V-A APPROACH, LIST I AND A-V APPROACH, LIST II FOR HIGH READERS

		Visual-auditory Approach, List I			
		Entire Word	First Syllable	Second Syllable	Phoneme Count
Auditory-visual Approach, List II	Entire Word	.38	.23	.47	.40
	First Syllable	.26	.26	.24	.18
	Second Syllable	.48	.32	.57*	.53
	Phoneme Count	.52	.49	.49	.48

* Significant at the .05 level

Data from Table XXI show that second syllable identification, A-V Approach, List II correlated significantly at the .05 level with second syllable identification, V-A Approach, List I. Although only second syllable identification measures reached statistical correlation, there were relationships that came close to significance at the .05 level. Second syllable and phoneme identification for both for the A-V Approach, List II and the V-A Approach, List I had correlations with each other and entire word identification that approached statistical significance.

The trend exhibited in the A-V Approach, List II and V-A Approach, List I is contrary to that exhibited in the A-V Approach, List I and V-A Approach, List II. The findings suggest that:

(a) The word lists may have lent themselves more favourably to one approach than another for high readers.

(b) Since different subjects were in the A-V Approach, List I and V-A Approach, List II than were in the A-V Approach, List II and V-A Approach, List I, the sampling could account for the different results observed.

Pearson product-moment correlations were also used between all measures for low readers and are illustrated in Tables XXII and XXIII.

TABLE XXII

CORRELATIONS OF IDENTIFICATION SCORES FOR A-V APPROACH, LIST I AND V-A APPROACH, LIST II FOR LOW READERS

		Auditory-visual Approach, List I			
		Entire Word	First Syllable	Second Syllable	Phoneme Count
Visual-auditory Approach, List II	Entire Word	.39	.14	.49	.20
	First Syllable	.22	.11	.26	.15
	Second Syllable	.49	.49	.62*	.51
	Phoneme Count	.23	.34	.28	.40

* Significant at the .05 level

The analysis revealed a correlation, significant at the .05 level, between second syllable identification, A-V Approach, List I and second syllable identification V-A

Approach, List II. A correlation, significant at the .05 level, for the same identification measures, A-V Approach, List II and V-A Approach, List I was observed for high readers. Although no two other measures reached statistical significance, there was a general trend, especially for second syllable identification measures in both approaches, towards positive correlations. Since significant correlations between second syllable identifications on different approaches also existed for high readers, it could be that the processes by which readers attempt pronunciation of the second syllable are similar, regardless of teaching approach employed.

TABLE XXIII

CORRELATIONS OF IDENTIFICATION SCORES FOR V-A APPROACH, LIST I AND A-V APPROACH, LIST II FOR LOW READERS

		Visual-auditory Approach, List I			
		Entire Word	First Syllable	Second Syllable	Phoneme Count
Auditory-visual Approach, List II	Entire Word	-.12	-.26	-.30	-.43
	First Syllable	.09	-.07	-.07	-.26
	Second Syllable	-.04	-.05	-.14	-.14
	Phoneme Count	.17	.15	.11	.08

The analysis of correlational data (Table XXIII) revealed no significant correlations between identification measures on the A-V Approach, List II and the V-A Approach, List I. Most correlations were negative or of a very low positive value suggesting that performance in one approach was not predictive of performance in the other approach.

VI. DIFFERENCES BETWEEN THE PERFORMANCE OF HIGH READERS AND LOW READERS ON LIST I AND LIST II

Since the test data obtained from Word List I outlined in sections II and III of this chapter were somewhat different than data obtained from Word List II outlined in sections IV and V, further comparisons between word lists were performed. These comparisons used mean scores for entire word, first syllable and second identification measures and are illustrated by the way of various graphs. Phoneme identification was not included in the comparisons since phoneme scores ranged from zero to thirty-four while the three other measures ranged only from zero to six.

An analysis of data for the A-V Approach, List I and II is shown in Figure 11.

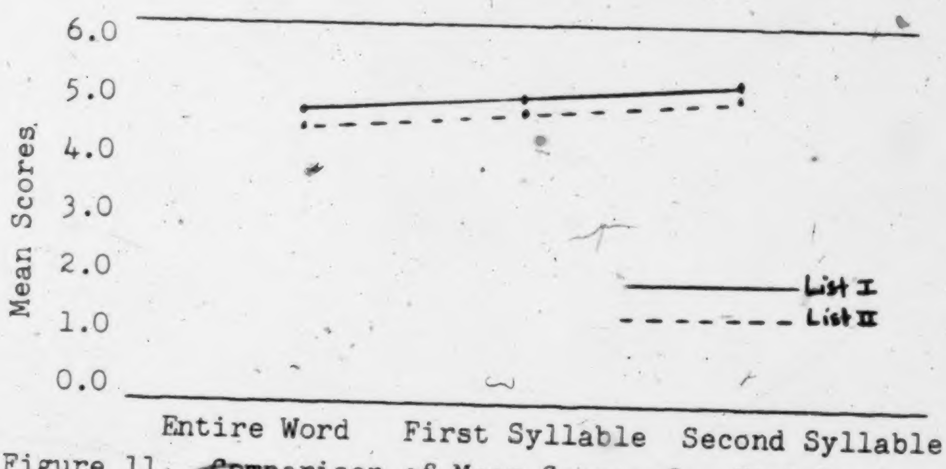


Figure 11. Comparison of Mean Scores for High Readers on A-V Approach, Lists I and II

The graph shows that the mean performance of high readers on Lists I and II were very similar. List I showed only slightly higher results suggesting that the lists themselves made no significant difference for the A-V Approach performance.

An analysis of data for the V-A Approach is shown in Figure 12.

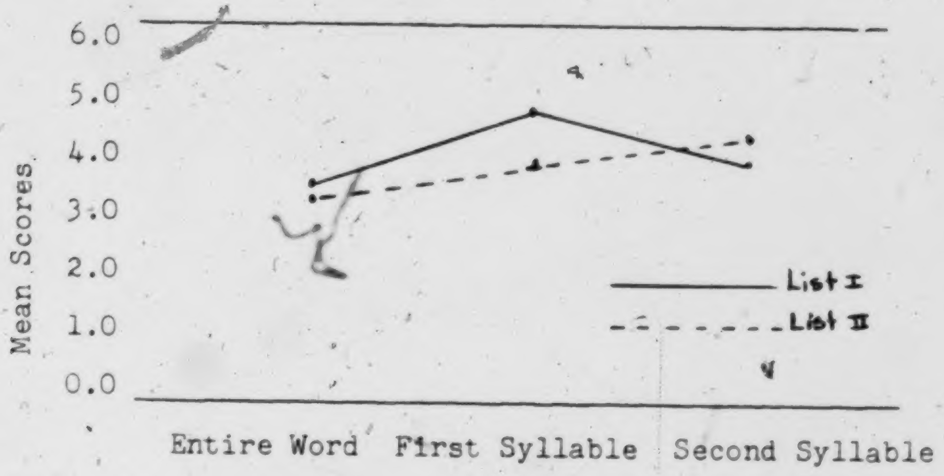


Figure 12. Comparison of Mean Scores for High Readers on V-A Approach, Lists I and II

As outlined in previous sections of this chapter, results from the V-A Approach were lower than those from the A-V Approach for high readers. Performance on the two word lists in the V-A Approach was not quite as uniform as in the A-V Approach, the main difference being the spread between first syllable mean scores. However, entire word and second syllable scores were quite similar. As in the A-V Approach, higher results were observed with List I.

The results of the A-V Approach for low readers are shown in Figures 13 and 14.

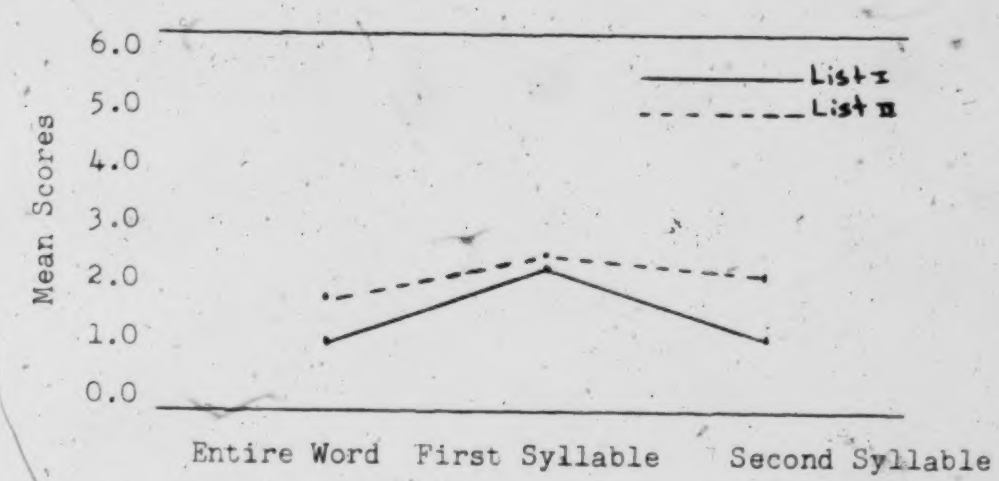


Figure 13. Comparison of Mean Scores for Low Readers on A-V Approach, Lists I and II

Higher results were observed with List II for the A-V Approach for low readers. High readers, on the other hand, had a better overall performance on List I for both approaches (see Figures 11 and 12). The differences between Word Lists I and II were quite large considering the lower scores of low readers. However, there was little difference between Lists I and II for first syllable identification indicating that the difference between entire word mean scores for the A-V Approach, Lists I and II lies within the second syllable.

An analysis of data for the V-A Approach for low readers is shown in Figure 14.

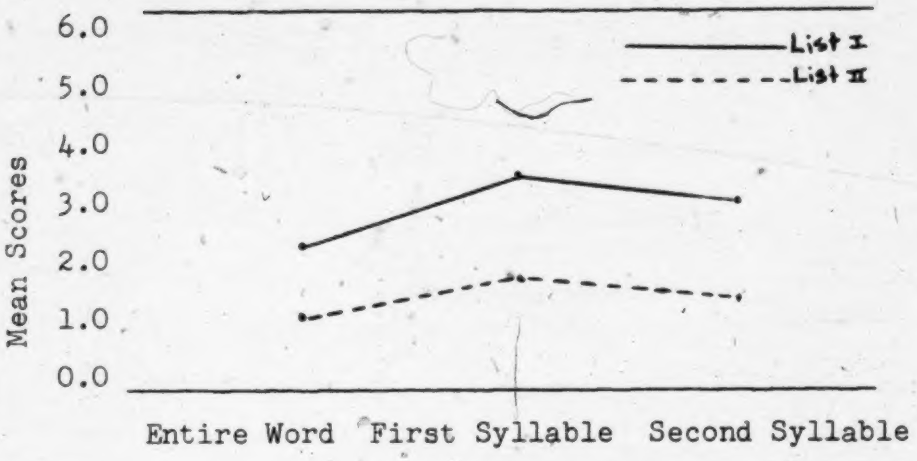


Figure 14. Comparison of Mean Scores for Low Readers on V-A Approach, Lists I and II

The low readers obtained higher results on the V-A Approach, List I. The difference between word lists was quite large beginning with a 1.2 mean difference in entire word scores and rising to a mean difference of 1.8 in second syllable scores.

In summary, List I showed higher results for low and high readers on both approaches with the exception of the A-V Approach for low readers where List II showed considerably higher scores. High readers' scores for Lists I and II on the A-V Approach were remarkably similar. This similarity of scores was also observed for their performance on Lists I and II for the V-A Approach except for first syllable identification. Low readers, on the other hand, exhibited scores that were not so consistent. Large differences existed between performances on

Word Lists I and II for both A-V and V-A Approaches, except for first syllable identification in the A-V Approach for low readers.

Word lists then, did appear to make a difference in the four word identification measures, especially for low readers.

VII. SUMMARY OF FINDINGS

The findings resulting from the interpretation of the test data are summarized as follows:

1. High and low readers differed significantly on their identification scores for the A-V and V-A Approaches and Word Lists I and II. High readers always achieved higher scores than did low readers regardless of the approach.
2. High readers had higher scores on the A-V Approach, List I for all measures of identification. Significant differences existed between scores for entire word and second syllable identification measures.
3. Low readers scored higher on the V-A Approach, List I with significant differences for all measures.
4. High readers scored higher on the A-V Approach, List II for all measures with significant differences for entire word and first syllable identification measures.
5. Low readers obtained higher scores on the A-V Approach, List II for all measures. However, significant differences occurred only for phoneme identification.

6. In general it appears that high readers learn best when taught by an auditory sequence focus and low readers do better with a visual sequence focus. The nature of the words, however, may affect the learning outcomes of either approach.

7. Mean scores on the A-V Approach did not show a significant relationship with mean scores on the V-A Approach for high readers except for second syllable identification scores on the A-V Approach, List II and the V-A Approach, List I. Mean scores on the A-V Approach did not show a significant relationship with mean scores on the V-A Approach for low readers except for second syllable identification scores on the A-V Approach, List I and the V-A Approach, List II. The lack of relationships indicates the independence of the A-V and V-A Approaches.

8. High readers showed very similar results in the A-V Approach, regardless of the word list. They also showed highly similar results in the V-A Approach regardless of word list except for first syllable identification where the score was much higher on List I.

9. Low readers exhibited dissimilar results in the A-V Approach and in the V-A Approach suggesting word lists made a difference in their learning to identify words by different sequence focusses.

10. As an overall result Word List I met with higher results regardless of teaching approach employed.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

I. SUMMARY

The purpose of this investigation was to determine if high and low readers differed in their performance on word identification tasks when taught by an auditory-visual or visual-auditory sequence focus approach. To achieve this purpose, the main test instruments were constructed by the investigator to measure the students' ability to identify words when taught by the A-V Approach and the V-A Approach. Attempting to discover if subjects' incorrect identification of word items was due to gross or fine errors three further measures of identification were devised. These measures were first syllable, second syllable and phoneme identification.

Reading ability was assessed by means of The Gates MacGinitie Reading Test, Primary A, Form 2. The subjects were screened for visual and auditory acuity. A pretest of word identification was given to all subjects. Those who correctly identified word items were eliminated from the study. Both the A-V and V-A Approaches were individually administered to the forty-eight grade one subjects.

Two-way analyses of variance were used to determine the differences between high and low readers on the four measures of word identification for the A-V and V-A Approaches, List I and List II. Pearson product-moment correlations were used to determine the relationships between scores on the A-V and V-A Approaches.

II. CONCLUSIONS

The following null hypotheses were tested and statistical data support what appear to be valid conclusions.

Null Hypothesis I

There is no significant difference between high and low readers on the A-V and V-A Approaches for List I as determined by scores on:

(a) entire word

(b) first syllable

(c) second syllable

(d) phoneme count.

Two-way analyses of variance revealed differences, significant at the .01 level, between high readers' and low readers' scores on the four measures of identification. Therefore, Hypotheses I (a), I (b), I (c) and I (d) were rejected. High readers scored significantly higher than low readers on the A-V and V-A Approaches, List I. The most pronounced difference between high and low readers' scores occurred at the second syllable level of identification while the least pronounced difference (although significant at the .01 level) occurred at the first syllable level of identification. Significant interaction effects were found at all levels of identification, except first syllable identification, suggesting that entire word, second syllable and phoneme identification of high and low readers are dependent upon the particular approach used. These differences between identification measures also indicate that high and low readers exhibit more differences in identification skills than are readily apparent at the entire word level of identification.

Null Hypothesis II

There is no significant difference between high and low readers on the A-V and V-A Approaches for List II as determined by scores on:

(a) entire word
(b) first syllable
(c) second syllable
(d) phoneme count.

Hypotheses II (a), II (b), II (c) and II (d) were rejected since analyses of variance for the measures of identification reached significance at the .01 level. The findings show that children who are high readers learned to identify words by both the A-V and V-A Approaches significantly better than children who are low readers. As in List I results (Hypothesis I) the least pronounced difference (although significant at the .01

level) occurred at the first syllable level of identification. However, differences between high and low readers for the measures of entire word, second syllable and phoneme count were quite similar to each other. As no significant interaction effects were found it was suggested that these differences were independent of the A-V and V-A Approaches.

Null Hypothesis III

High readers do not differ significantly between scores on the A-V and V-A Approaches, List I for:

(a) entire word

(b) first syllable

(c) second syllable

(d) phoneme count.

A Scheffé multiple comparison of means test revealed a difference, significant at the .05 level, between the A-V and V-A Approaches for entire word identification for high readers. Therefore, Hypothesis III (a) was rejected, the A-V Approach scores being significantly higher than the V-A Approach scores for high readers on their pronunciation of the entire word. The difference between the two approaches for first syllable identification did not reach statistical significance, thus Hypothesis III (b) could not be rejected. High readers appeared to identify first syllables almost equally well, regardless of the approach used. However, a difference, significant at the .01 level, was found between the A-V and V-A Approaches for second syllable identification. Therefore, Hypothesis III (c) was rejected, the A-V Approach being superior. Therefore, the superiority of the A-V Approach, List I for high readers was most apparent in second syllable identification.

The difference between the two approaches for phoneme identification did not reach statistical significance suggesting that the superiority of the A-V Approach, List I was due to fine rather than gross phonemic errors in the identification of words taught by the V-A Approach, List I. Therefore, Hypothesis III (d) was not rejected.

Null Hypothesis IV

High readers do not differ significantly between scores on the A-V and V-A Approaches, List II for:

(a) entire word
(b) first syllable
(c) second syllable
(d) phoneme count.

A Scheffé test revealed a difference, significant at the .05 level, between the A-V and V-A Approaches for entire word identification. The A-V Approach scores were significantly higher and Hypothesis IV (a) was therefore rejected. Hypothesis IV (b) was also rejected since a difference, significant at the .05 level, was revealed. Thus the A-V Approach, List II was significantly better for first syllable identification for high readers. Hypothesis

IV (c) was not rejected since the difference between the approaches for second syllable identification did not reach statistical significance. However, A-V Approach scores were higher than V-A Approach scores. The differences between the approaches for phoneme identification did not reach statistical significance. But maintaining the superiority of the A-V Approach, List II over the V-A Approach, List II, the A-V Approach scores were still higher.

Null Hypothesis V

Low readers do not differ significantly between scores on the A-V and V-A Approaches, List I for:

(a) entire word
(b) first syllable
(c) second syllable
(d) phoneme count.

A Scheffé test revealed a difference, significant at the .05 level, between the A-V and V-A Approaches for entire word identification for low readers. Thus Hypothesis V (a) was rejected, the V-A Approach scores being significantly higher. Hypothesis V (b) was also rejected since a difference, at the .05 level of significance, was revealed between the approaches for first syllable identification. The V-A Approach scores were significantly higher for first syllable identification. Hypotheses V (c) and V (d) were also rejected since differences, significant at the .01 level, were revealed between approaches for second syllable and phoneme identification. Thus the superiority of the V-A Approach, List I was most apparent in second syllable and phoneme identification. The significant difference between the approaches for phoneme identification suggests that the superiority of the V-A Approach, List I was due to gross rather than fine phonemic errors in the identification of words taught by the A-V Approach, List I.

Null Hypothesis VI

Low readers do not differ significantly between scores on the A-V and V-A Approaches, List II for:

(a) entire word
(b) first syllable
(c) second syllable
(d) phoneme count.

Two-way analysis of variance revealed a difference, significant at the .01 level, between the A-V and V-A Approaches, List II for entire word identification while differences, at the .05 level of significance, were revealed for first syllable, second syllable and phoneme identification for high and low readers considered as one group. No interaction effects were noted suggesting that performance on the A-V and V-A Approaches was independent of reading groups. However, Scheffé multiple comparison of means tests were conducted on the four measures of identification to determine if significant differences existed between the A-V and V-A Approaches, List II.

Although the A-V Approach, List II had higher scores for the four measures of identification, these differences failed to reach statistical significance for entire word, first syllable and second syllable identification for low readers. Therefore, Hypotheses VI (a), VI (b) and VI (c) were not rejected. These findings indicate no significant difference between the A-V and V-A Approaches for low readers on entire word, first syllable and second syllable identification scores. However, Hypothesis VI (d) was rejected since a difference, significant at the .05 level, was revealed between approaches for phoneme identification. This difference indicates that low readers identified significantly more phonemes on the A-V Approach than on the V-A Approach when they were asked to pronounce the words in List II.

Null Hypothesis VII

There are no significant correlations for high readers between:

(a) A-V Approach, List I and V-A Approach, List II

(b) A-V Approach, List II and V-A Approach, List I.

Analysis of the data revealed no significant relationships between the A-V Approach, List I and the V-A Approach, List II for high readers. Therefore, Hypothesis VII (a) was not rejected for all four measures of identification. These findings show that high readers' scores on the A-V Approach, List I were independent of their scores on the V-A Approach, List II.

No significant relationships were found between the A-V Approach, List II and the V-A Approach, List I except between second syllable identification scores for both approaches. Therefore, Hypothesis VII (b) was rejected only for second syllable relationship. This relationship was significant at the .05 level and was the only significant relationship found in the 4 X 4 matrix of word identification scores. However, there was a trend towards higher correlations indicating that high readers' scores on the A-V Approach, List II and the V-A Approach, List I exhibited much stronger relationships than they did on the A-V Approach, List I and the V-A Approach, List II.

Null Hypothesis VIII

There are no significant correlations for low readers between:

(a) A-V Approach, List I and V-A Approach, List II

(b) A-V Approach, List II and V-A Approach, List I.

Analysis of the data revealed no significant relationships between the A-V Approach, List I and the V-A Approach, List II except between second syllable identification scores of both approaches. This relationship was significant at the .05 level. Therefore, Hypothesis VIII (a) was rejected only for second syllable relationship. Although no other correlations reached statistical significance, there was a trend towards higher correlations between the second syllable score, *V-A Approach*, List II and the four measures of identification for the *A-V Approach*, List I.

No significant relationships were found between the *A-V Approach*, List II and the *V-A Approach*, List I for low readers. Therefore, Hypothesis VIII (b) was not rejected for any of the measures of word identification. Results suggest that performance in one approach was not indicative of performance in the other approach.

Summary and Conclusions

High readers consistently scored higher than low readers on word identification tasks. In general it appears that high readers learn best by an auditory sequence focus while low readers may prefer a visual sequence focus.

This summary of results, however, must be evaluated against several factors, some of which have been mentioned in findings of previous research studies.

(a) One factor which could have contributed to low readers' performance on the word identification tasks could have been the words being taught. King and Muehl (1965) found that the words used in their study of the visual, auditory and kinesthetic modalities appeared to affect the success of the approach used.

(b) The composition of the sample could also have been a factor in the observed results. It is possible a sex factor was operating since the sample was composed of twenty-nine boys but only nineteen girls. MacAulay (1965) found boys learned better by the visual and auditory methods. However, Mills (1956) and Wolpert (1970) found no significant differences in the sexes for any of the four modality methods employed in their studies. The variable of I Q, a factor not considered in this study, could also have contributed to the observed results. Mills (1956) found the visual and kinesthetic methods to be most effective for children of lower intelligence. However, MacAulay (1965) and Wolpert (1970) found little relationship between I Q and the ability to learn by any one modality method.

(c) Possibly another factor contributing to the results was the subject's ability to integrate material presented via the auditory and visual modalities. High readers could have performed better on the A-V Approach because the auditory focus was presented before the visual focus. On the other hand, low readers could have performed better on the V-A Approach because they are more able to integrate information when the visual focus is presented before the auditory focus.

III. IMPLICATIONS FOR EDUCATION

1. The results of this study indicate that high readers perform significantly higher on word identification tasks that have an auditory-visual sequence focus approach. Rather than suggesting that all high readers be instructed in a like manner for word identification skills, it would appear to be more profitable to determine why they display this preference for the A-V Approach. High readers, by their higher scores on the A-V Approach, could be merely displaying the method by which they were taught. The reading methods the children in this sample were exposed to for a period of seven months were based upon an auditory-visual approach. The implication resulting from this information is twofold:

(a) That earlier in the school year teachers determine through observation and diagnostic testing the relative strengths and weaknesses of their pupils in learning word identification skills and modify instruction to accommodate their individual needs.

(b) If high readers do not appear to display preferences in word identification skills that affect their performance, teachers should not attempt to change approaches in which these children have already found success. The findings from this study suggest that once high readers have developed a strategy for word identification skills they are inclined to excell via that strategy. Informal observations made by the investigator during the study suggest that high readers became rather confused and lost confidence when presented with a strategy (V-A Approach) they either were not familiar with or found difficult to learn by.

2. The results of this study indicated that low readers demonstrated a preference for the V-A Approach, List I but failed to demonstrate a definite preference for the A-V or V-A Approach, List II. These findings suggest that:

(a) The word lists themselves were instrumental in the results received via the A-V and V-A Approaches. If the words themselves contributed to the difference between approaches a further implication seems evident; teachers should be prepared to accept the word to be taught to be as important as the approach itself for low readers. On the other hand, high readers performed quite consistently via the A-V Approach regardless of word stimulus (see figure 11). If certain words do appear to lend themselves better to auditory or visual sequence focus approaches, the teacher must be prepared to experiment with words and approaches to discover the most effective method for small groups of low readers, or if necessary, individual low readers. If a child does not learn by one approach then perhaps the other method could be tried.

(b) Since the data from which the results were obtained came from two different groups of low readers, it could be that these two different groups, although randomly assigned, account for the discrepancy of results between List I and List II. To clarify this, the group of low readers that received the V-A Approach, List I was not the group of readers that received the V-A Approach, List II. Therefore one-half of the total sample of low readers demonstrated a preference for the V-A Approach. That one half of the low readers scored higher on the V-A Approach holds a further implication for classroom teachers. Although information gathered from the classroom teachers in this study suggests that the methods they used were based upon an auditory-visual approach, one half of the low readers, unlike the high readers, preferred an approach (V-A) with which they were not familiar. Therefore, teachers must be prepared to accept that many low readers may prefer an approach which has a visual rather than an auditory sequence focus approach and must be prepared to modify their present methods of instruction accordingly to suit the needs of these individual low readers.

3. The four measures of word identification that were used in this study provided valuable information in discovering where children made errors in identification within words. A similar type of error analysis might prove useful to teachers when assessing a child's word identification skills. Furthermore, information gathered

in this study indicates that low readers made far more errors in second syllable than first syllable identification. This demonstrates the need for teachers to alert low readers to the second syllable and to teach them to focus on the second syllable as well as the first. However, high readers more often correctly identified the second syllable which suggests a need for teachers to teach high readers to focus on the first as well as the second syllable.

4. The visual and auditory screening tests used in this study identified three children with visual acuity deficiencies and three with auditory acuity deficiencies. It would seem advisable that acuity tests be conducted on all children entering grade one.

IV. SUGGESTIONS FOR FURTHER RESEARCH

1. A follow-up study using a different sample of high and low grade one readers may provide further information with regards to high and low readers' preference for an auditory-visual or visual-auditory sequence focus approach. Such a study would be of particular relevance for low readers since the findings of this study suggest that the two groups of low readers differed in their performances on the A-V and V-A Approaches.

2. A study might be designed to determine the emphasis, focus and sequence that present reading

approaches give to the auditory and visual modalities.

3. A study similar to this one, but conducted earlier in the school year, for grade one children could prove quite informative since the children's preference for an auditory or visual sequence focus approach would be less influenced by teaching methods to which they were exposed.

4. The sample for this study was chosen on the basis of their reading ability; a study which included the variable of IQ could possibly provide interesting data.

5. Since only low and high reading achievers were considered in this study, further research needs to be conducted with the average group of reading achievers in grade one.

6. A study similar to this could be constructed to study correlates of auditory-visual and visual-auditory sequence focus approaches. Included could be variables such as auditory and visual memory and auditory and visual discrimination.

7. Although this study took cognizance of the reading methods the subjects were exposed to, a study is needed which more specifically deals with the relationship of reading methodology and visual and auditory sequence focusses.

CONCLUDING STATEMENT

This study has found that high and low readers differ in their performance on the V-A and A-V Approaches, both within and between approaches. High readers demonstrated a preference for the A-V Approach while low readers showed divergence in their preference. One group of low readers who received the V-A Approach, List I and the A-V Approach, List II, demonstrated a strong preference for the V-A Approach, List I. The second group of low readers who received the A-V Approach, List I and the V-A Approach, List II, showed no preference for either approach except for phoneme identification with the A-V Approach, List I.

Further research needs to be conducted with high, average and low reading achievers in grade one to provide additional information on the relationships of reading ability, A-V and V-A Approaches and the subjects' present reading methodology. However, in view of the findings of this study it appears that the A-V and V-A Approaches are viable instruments for helping determine a child's preferred mode of learning.

BIBLIOGRAPHY

BIBLIOGRAPHY

Allport, F. H. *Theories of perception and the concept of structure*. New York: Wiley, 1955.

Arnold, R. D. Four methods of teaching word recognition to disabled readers. *The Elementary School Journal*, 1968, 269-274.

Aukerman, R. C. *Approaches to beginning reading*. New York: Wiley, 1971.

Bannatyne, A. The transfer from modality perceptual to modality conceptual. In H. K. Smith (Ed.), *Perception and reading*. Newark, Delaware: IRA Conference Proceedings, 1968, *12*, 7-16.

Bateman, B. The efficacy of an auditory and a visual method of first grade reading instruction with auditory and visual learners. In H. K. Smith (Ed.), *Perception and reading*. Newark, Delaware: IRA Conference Proceedings, 1968, *12*, 105-112.

Beery, J. Matching of auditory and visual stimuli by average and retarded readers. *Child Development*, 1967, *38*, 827-833.

Berman, A. The influence of the kinesthetic factor in perception of symbols in partial reading disability. *The Journal of Educational Psychology*, 1939, *30*, 187-198.

Birch, H. G. and Belmont, L. Auditory-visual integration in normal and retarded readers. *American Journal of Orthopsychiatry*, 1964, *34*, 852-861.

Bond, G. L. *The auditory and speech characteristics of poor readers*. New York: Columbia University Publications, 1935.

Bursuk, L. Z. Sensory mode of lesson presentation as a factor in the reading comprehension improvement of adolescent retarded readers. *Dissertation Abstracts International*, 1969, *30*, 2370-A.

Coleman, J. C. Learning method as a relevant subject variable in learning disorders. *Perceptual and Motor Skills*, 1962, *14*, 263-269.

Cooper, J. D. A study of the learning modalities of good and poor first grade readers. Unpublished doctoral dissertation, University of Indiana, 1969.

Crocker, M. R. A comparison of reading vocabulary achievement in children with and without auditory dysfunction under single and dual-sensory modality treatments. Dissertation Abstracts International, 1970, 31, 5230-A.

Dechant, E. V. Improving the teaching of reading. (2nd ed.) New Jersey: Prentice-Hall, 1970.

de Hirsch, K. Psychological correlates in the reading process. In J. A. Figurel (Ed.), Challenge and experiment in reading. New York: Scholastic Magazines, IRA Conference Proceedings, 1962, 7, 218-226.

de Hirsch, K., Jansky, J. J., and Langford, W. S. Predicting reading failure. New York: Harper & Row, 1966.

Durkin, Dolores. Teaching them to read. (2nd ed.) Boston: Allyn & Bacon, 1974.

Ferguson, G. A. Statistical analysis in psychology & education. (3rd ed.) New York: McGraw-Hill, 1971.

Ford, M. P. Auditory-visual and tactual-visual integration in relation to reading ability. Perceptual and Motor Skills, 1967, 24, 831-841.

Forster, M. Visual and visual-kinesthetic learning in reading nonsense syllables. Journal of Educational Psychology, 1941, 32, 452-458.

Goodman, K. S. (Ed.), The psycholinguistic nature of the reading process. Detroit: Wayne State University Press, 1968.

Harris, A. J. How to increase reading ability. (5th ed.) New York: David McKay, 1970.

Harris, A. J. Influences of individual differences on the reading program. In H. A. Robinson (Ed.), Meeting individual differences in reading. Chicago: University Press, Supplementary Educational Monographs, 1964, 26, 25-33.

Goins, J. T. Visual and auditory perception in reading. The Reading Teacher, 1959, 13, 9-13.

Guszak, F. J. Diagnostic reading instruction in the elementary school. New York: Harper & Row, 1972.

Jones, J. D. A study of the relationships among intersensory transfer, intersensory perceptual shifting, modal preference and reading achievement at the third grade level. Unpublished doctoral dissertation, University of Georgia, 1970.

Kahn, D. and Birch, H. G. Development of auditory-visual intergration and reading achievement. Perceptual and Motor Skills, 1968, 27, 459-468.

Katz, P. A. and Deutsch, M. Modality of stimulus presentation in serial learning for retarded and normal readers. Perceptual and Motor Skills, 1964, 19, 627-633.

King, E. M. and Muehl, S. Different sensory cues as aids in beginning reading. The Reading Teacher, 1965, 19, 163-168.

Lerner, J. W. Children with learning disabilities. Boston: Houghton Mifflin, 1971.

Lockard, J. and Sidowski, J. B. Learning in fourth and sixth graders as a function of sensory mode of stimulus presentation and overt or covert practice. Journal of Educational Psychology, 1961, 52, 262-265.

Lowenfeld, V. Tests for visual and haptical aptitudes. American Journal of Psychology, 1945, 58, 100-111.

MacAulay, D. S. Word recognition as a function of sensory mode of learning for first grade entrants. Unpublished master's thesis, University of Alberta, 1965.

Mills, R. E. An evaluation of techniques for teaching word recognition. Elementary School Journal, 1956, 56, 221-225.

Muehl, S. and Kremenak, S. Ability to match information within and between auditory and visual sense modalities and subsequent reading achievement. Journal of Educational Psychology, 1966, 57, 230-239.

Nelson, J. B. The effect of visual-auditory modality preference on learning mode preference in first grade children. Dissertation Abstracts International, 1970, 31, 2219-A.

Pick, A. D. Some basic perceptual processes in reading. Young Children, 1969, 25, 162-181.

Roberts, R. W., and Coleman, J. C. An investigation of the role of visual and kinesthetic factors in reading failure. Journal of Educational Research, 1958, 51, 445-453.

Robinson, H. M. Visual and auditory modalities related to methods for beginning reading. Reading Research Quarterly, 1972, 8, 7-39.

Smith, C. M. The relationship of reading method and reading achievement to ITPA sensory modalities. Dissertation Abstracts International, 1969, 30, 2916-A.

Smith, F. Understanding reading. New York: Holt, Rinehart and Winston, 1971.

Spache, G. D. and Spache, E. B. Reading in the elementary school. Boston: Allyn & Bacon, 1964.

Taylor, D. R. A study of the teaching of sight words to poor readers in grade one through their preferred modes of learning. Unpublished master's thesis, University of Alberta, 1969.

Underwood, B. J., and Schulz, R. W. Meaningfulness and verbal learning. Chicago: Lippincott, 1960.

Vernon, M. D. The perceptual process in reading. The Reading Teacher, 1959, 13, 2-13.

Wepman, J. M. The perceptual basis for learning. In H. A. Robinson (Ed.), Meeting individual differences in reading. Chicago: University of Chicago Press, Supplementary Educational Monographs, 1964, 25-33.

Wepman, J. M. Dyslexia: Its relationship to language acquisition and concept formation. In J. Money (Ed.), Reading disability: progress and research needs in dyslexia. Baltimore: John Hopkins Press, 1966, 179-186.

Wepman, J. M. The modality concept. In H. K. Smith (Ed.), Perception and Reading. Newark, Delaware: IRA Conference Proceedings, 1968, 12, 1-6.

Whitehead, L. G. A study of visual and aural memory processes. Psychological Review, 1896, 3, 258-269.

Wiener, M. and Cromer, W. Reading and reading difficulty: a conceptual analysis. Harvard Educational Review, 1967, 37, 620-643.

Wolpert, E. M. Individual differences in sensory modality functioning in first grade children in learning to read common words of two imagery values. Dissertation Abstracts International, 1970, 31, 2751-A.

APPENDIX A

DESCRIPTIVE DATA FOR THE FINAL SAMPLE

TABLE XXIV

DESCRIPTIVE DATA FOR THE FINAL SAMPLE

Subject Number	Sex	C.A. (in months)	Average Reading Raw Score
2	F	75	40.5
3	M	82	43.5
4	M	81	48.5
5	M	76	48.5
6	F	87	49.0
7	M	78	50.0
13	F	77	61.0
14	F	84	61.0
15	M	76	64.0
16	M	85	65.0
17	F	79	67.0
18	F	81	67.5
19	F	78	68.0
20	F	80	69.0
22	M	69	73.0
24	M	85	33.0
25	M	77	40.5
26	M	83	44.0
28	F	75	46.0
29	M	77	50.0
39	M	84	61.5
41	M	77	63.5
43	F	83	68.5
44	M	82	72.5
45	M	83	73.0
47	F	78	42.5
48	M	87	43.5
49	F	80	46.5
50	F	83	48.0
51	M	82	49.5
52	M	79	51.5
53	F	74	51.5
64	M	81	61.5
66	M	85	63.0
67	F	82	64.0
70	M	80	37.0
72	M	73	47.5
73	M	74	48.5
74	M	82	50.0

TABLE XXIV (Continued)

Subject Number	Sex	C.A. (in months)	Average Reading Raw Score
75	M	84	50.0
76	F	80	50.5
86	F	87	61.0
88	M	74	61.5
89	M	79	62.5
91	M	79	64.5
92	F	82	65.0
93	F	76	65.0
94	M	87	68.5

29 - M
19 - F

$\bar{x} = 79.8$

$\bar{x} = 55.9$

APPENDIX B

PRETEST OF WORD IDENTIFICATION

PRE - TEST OF WORD IDENTIFICATION

NAME:
AGE:
SEX:
ACHIEVER:
SCHOOL:
TEACHER:
DATE:

goidal
bonher
saynop *
whabut
fetomp
slorat
dapifo *
melfib

soupim
kitlar
faibot *
chafem
relund
frohum
pimati *
balsud

---

* Deleted from the main study

APPENDIX C

FINAL WORD LISTS

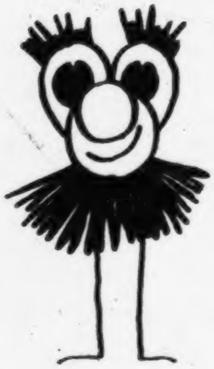
FINAL WORD LISTS

List I	List II
soupim	goidal
kitlar	bonher
balsud	melfib
frohum	slorat
chafem	whabut
relund	fetomp

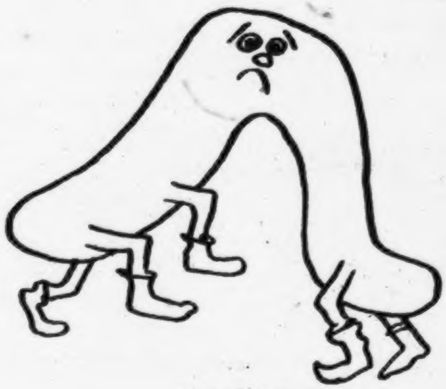
APPENDIX D

NEUTRAL PICTURES AND THEIR CORRESPONDING NONSENSE WORDS

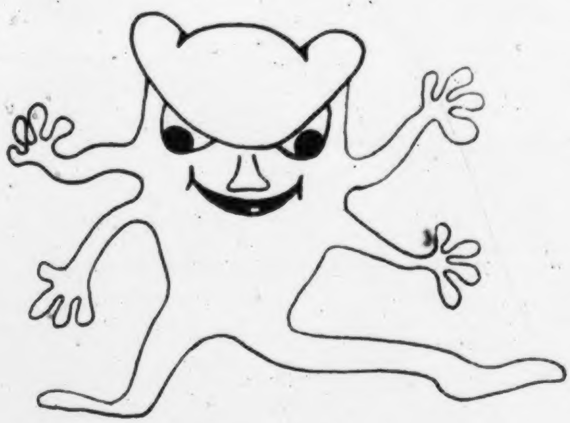
LIST I



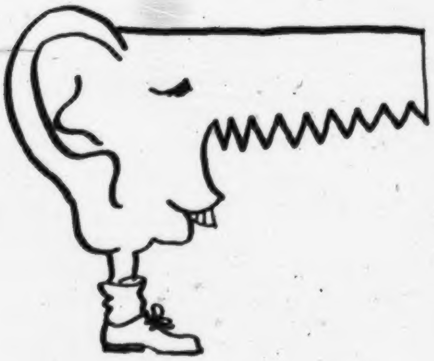
goidal



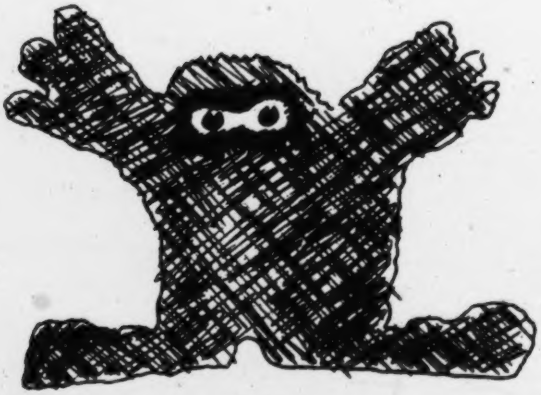
bonher



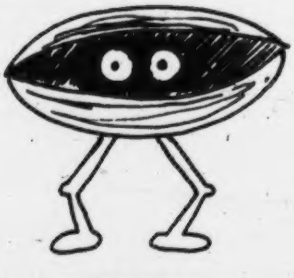
melfib



slorat

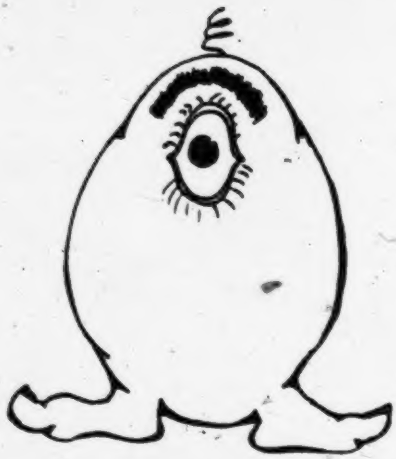


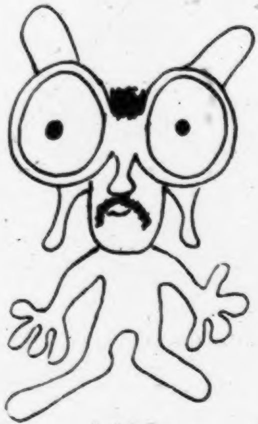
whabut

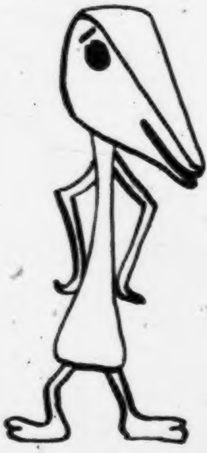


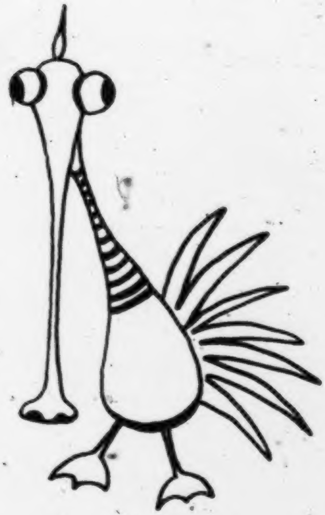
fetomp

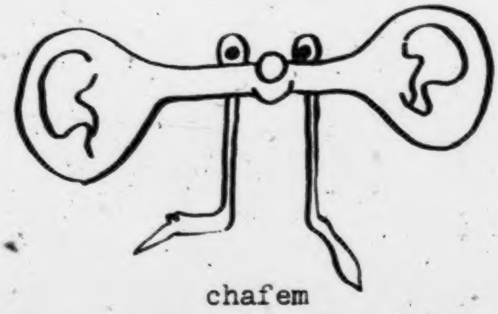
LIST II

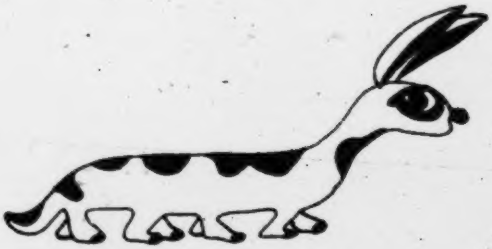

soupim


kitlar


balsud


frohum


chafem


relund

APPENDIX E

PRONUNCIABILITY RATINGS ACCORDING TO UNDERWOOD AND SCHULZ (1960) FOR THE THREE LETTER UNITS USED IN THE A-V AND V-A APPROACHES

PRONUNCIABILITY RATINGS ACCORDING TO UNDERWOOD AND SCHULZ (1960) FOR THE THREE LETTER UNITS USED FOR THE A-V AND V-A APPROACHES

A low value indicates "easy to pronounce," a high value, "hard to pronounce."

List I		List II	
sou 4.15	pim 2.62	goi* 4.60	dal 2.62
kit 2.15	lar* 2.23	bon* 2.11	her* 2.06
bal 2.33	sud 1.99	mel 1.99	fib 1.92
fro* 2.40	hum 1.80	slo* 2.20	rat 1.81
cha 2.95	fem 1.95	wha* 3.23	but 1.91
rel 2.50	und* 3.83	fet* 2.49	omp 3.99

---

* Based on ratings of 35 subjects; all others based on ratings of 181 subjects.

APPENDIX F

INSTRUCTIONS AND PROCEDURES FOLLOWED FOR THE A-V AND V-A APPROACHES

INSTRUCTIONS AND PROCEDURES FOLLOWED FOR THE A-V AND V-A APPROACHES

When the subject arrived at the testing session, the investigator would greet him/her. "Hello _________, it's nice to see you again. How are you today? Do you remember who I am?" (A short conversation would ensue.)

"I have something very interesting for you to do. But, before we begin I'll tell you why I asked you to come here today. I want to find out the best way to teach grade one children how to read. Since you're in grade one and since you're learning how to read I thought you'd be able to help me."

"Look at these funny looking pictures and these strange looking words. I made up these brand new pictures and words. I don't think anyone has ever seen them before because I just made them up. They're brand new. Today I'm going to let you learn these brand new words. Are you ready to begin?"

The investigator would then proceed according to the Auditory-visual Sequence Focus Approach or the Visual-auditory Sequence Focus Approach.

Auditory-visual Sequence Focus Approach

1. "I am going to say six words to you, one at a time, and I want you to listen very carefully."
2. "The first word is _____, the second word is _____",

and so forth.

3. The investigator would then show the picture card to the subject and say, "this is a _____".
4. The investigator would then shuffle the picture card among the other five and say, "I'll say the word again and I want you to find the picture that goes with it". If the subject found the correct picture the investigator would say, "yes, that is the right picture". If the subject chose an incorrect picture the investigator would say, "no", find the correct picture herself and say, "this is the correct picture". If the subject did not identify the correct picture after ten seconds the investigator would find it and say, "this is the correct picture".

(Steps 3 and 4 were repeated for the five other words.)

5. The investigator would point to each picture and say, "this is a _____, this is a _____", and so forth.
6. The investigator would place the picture in front of the subject. "I am going to say the name of this picture again and I want you to repeat it after me. ____." If the subject made the correct response the investigator would say, "yes, _____ is correct". If the subject made an incorrect response the investigator would say, "no, it's _____" and have the subject repeat it. If the subject failed to respond within five seconds the investigator would say, "it's _____", and have the

subject repeat it.

7. "Now I am going to say the word in parts and then together. I want you to repeat what I say. _____ _____, _____."

(The procedure listed in step 6 for possible subject responses was followed here also.)

(Steps 6 and 7 were repeated for the five other words.)

8. "Now I am going to show you the word cards that go with the words we've been saying. I want you to look at each of these word cards very carefully because I'm going to ask you to say them later." The first word would be presented. "This word card is _____."

9. "Listen as I say the word in parts and show me the first part and the second part. _____ _____." If the subject identified both parts correctly the investigator would say, "yes, the parts are _____ and _____". If the subject did not identify both parts correctly the investigator would say, "no," point to the correct parts and say, "the parts are _____ and _____". If the subject failed to identify the parts within five seconds the investigator would point to the correct parts and say, "the parts are _____ and _____".

10. The investigator would then replace the word card with two syllable cards. "Put these two parts together and say _____." If the subject completed the task successfully the investigator would say, "yes, those

are the right parts and the word is _____". If the subject did not put the two word parts together correctly the investigator would say, "no", do it correctly herself and say "now, this is right". The investigator would then repeat her request. "Now ,you put these parts together and say _____." If the subject failed to do the task within five seconds the investigator would put the correct parts together and repeat her request. If the subject pronounced the word incorrectly, the investigator would say, "no, the word is _____" and ask the subject to repeat it. If the subject failed to pronounce the word within five seconds the investigator would pronounce the word and ask the subject to repeat it.

(Steps 8 - 10 were repeated for the other five words.)

11. The investigator would then present all word cards in a row. "Now I want you to pronounce these words for me." If the subject pronounced the first word correctly the investigator would say, "yes, it is _____". If the subject pronounced the first incorrectly the investigator would say, "no, it's _____" and ask the subject to repeat it. If the subject failed to pronounce the word within five seconds the investigator would say the word for the subject and ask him to repeat it. This procedure was repeated for the other five words. The entire procedure was repeated until the subject correctly pronounced all six words, or for

a maximum of three trials.

12. The identification test was then given. The investigator would shuffle the word cards and say, "this time I want you to say the words again. I'll mark down each word on this piece of paper as you say it". If the subject failed to pronounce a word within five seconds the investigator would pronounce it and then go on to the next word.

Visual-auditory Sequence Focus Approach

1. "I am going to show six words to you, one at a time, and I want you to look at each word very carefully."
2. "Let's look at the first word." The investigator would point to each letter moving the pointer from left to right across the first word, and so forth.
3. The investigator would present the first picture beside the first word and say, "this picture goes with this word".
4. The picture was left in front of the subject while the word card was shuffled among the five other cards. The investigator would say, "I want you to find the word that goes with this picture". If the subject found the correct word the investigator would say, "yes, that is the right word". If the subject chose an incorrect word the investigator would say, "no", find the correct word herself, and say, "this is the correct word". If the subject did not identify the

correct word after ten seconds the investigator would find it and say, "this is the correct word".

(Steps 3 and 4 were repeated for the five other words.)

5. The investigator would then point to each word and its picture and say, "this word goes with this picture", and so forth.
6. The investigator would replace the word card with the two syllable cards. "This is the same word as we looked at before only I've cut it into two parts. See the two parts." The investigator would put the two parts together. "Watch as I trace the shape of the word."
7. The investigator would add an additional syllable card and shuffle the three cards together. "Put the right parts together to make the word." If the subject chose the right parts and put them together correctly the investigator would say, "yes, those are the right parts". If the subject did the task incorrectly the investigator would say, "no", put the right parts together for the subject and repeat the request. If the subject failed to do the task within five seconds the investigator would do it for him and repeat the request.

(Steps 6 and 7 were repeated for the five other words.)

8. "Now I'm going to say each word so listen carefully because I'm going to ask you to say these words later." The first word card would be presented. "This word

is _____."

9. "Now, you repeat it after me, _____." If the subject said the word correctly the investigator would say, "yes, it is _____". If the subject pronounced the word incorrectly the investigator would say, "no, it's _____" and ask the subject to repeat it. If the subject failed to say the word within five seconds the investigator would pronounce the word for him and ask the subject to repeat it.

10. "Now I'm going to say the word in parts, and then together. I want you to repeat what I say. _____, _____, _____."

    (The procedure listed in step 6 for possible subject responses was followed here also.)

    (Steps 8 - 10 were repeated for the other five words.)

11. The investigator would then present all word cards in a row. "Now I want you to pronounce these words for me." If the subject pronounced the first word correctly the investigator would say "yes, it is _____". If the subject pronounced the first word incorrectly the investigator would say, "no, it's _____" and ask the subject to repeat it. If the subject failed to pronounce the word within five seconds the investigator would say the word for the subject and ask him to repeat it. This procedure was repeated for the other five words. The entire procedure was repeated until

the subject correctly pronounced all six words or for a maximum of three trials.

12. The identification test was then given. The investigator would shuffle the word cards and say, "this time I want you to say the words again. I'll mark down each word on this piece of paper as you say it." If the subject failed to pronounce a word within five seconds the investigator would pronounce it and then go on to the next word.

APPENDIX G

TEST OF WORD IDENTIFICATION - RECORD FORM

TEST OF WORD IDENTIFICATION - RECORD FORM

CHILD: ______________________________

SEX: ______________________________

ACHIEVER: ______________________________

SCHOOL: ______________________________

TEACHER: ______________________________

FOCUS: ______________________________

DATE: ______________________________

			SCORE			
	Nonsense Word	Child's pronunciation	Entire Word	First Syllable	Second Syllable	Individual Phonemes
1.						
2.						
3.						
4.						
5.						
6.						
POSSIBLE SCORE:						
OBTAINED SCORE:						